AFCA's President Halligan

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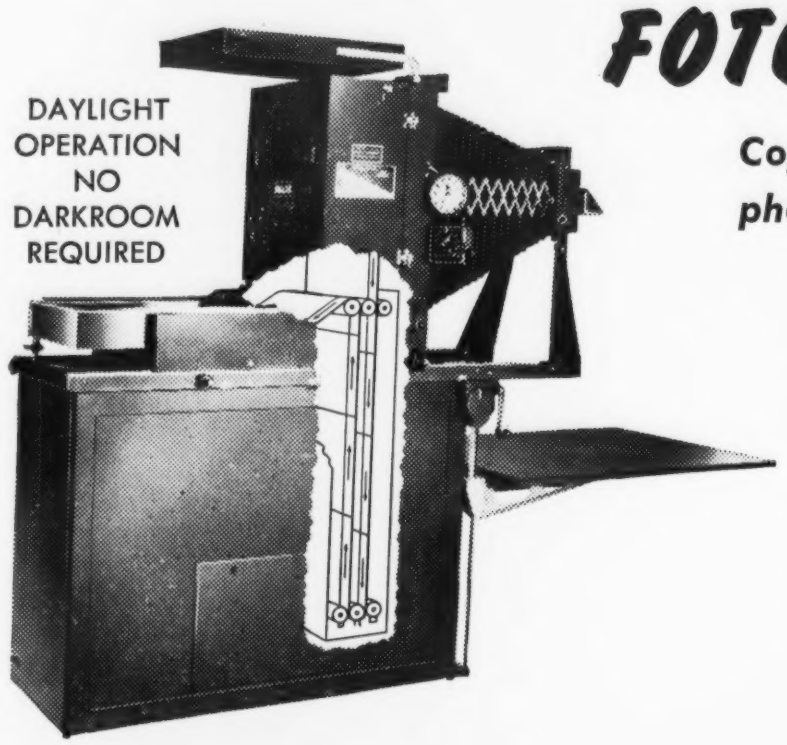

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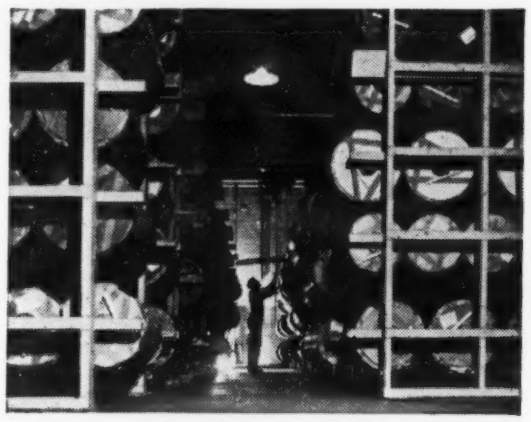

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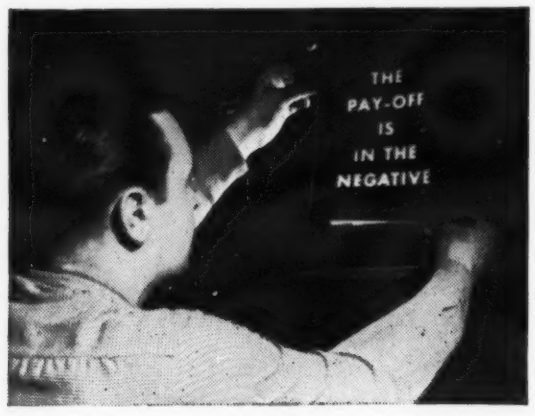

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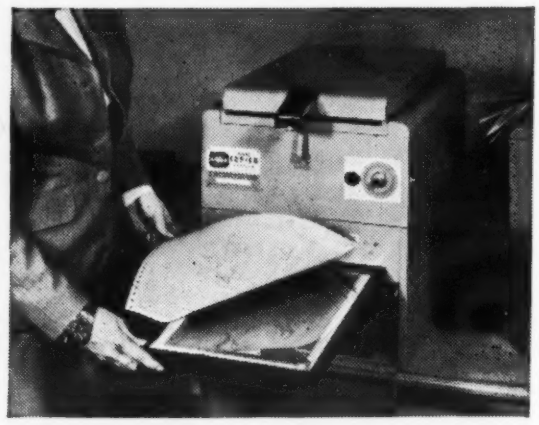

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EDITORIAL ASSISTANT
Marjorie Geoghegan

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ADVERTISING DEPARTMENT
Frank Martins, Mgr.
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Mills Building
San Francisco 4, Calif.

Duncan A. Scott & Co.
A. O. Dillenbeck, Jr., Mgr.
2978 Wilshire Blvd.
Los Angeles 5, Calif.

PUBLISHING DIRECTOR
George P. Dixon

SECRETARY
Erma M. Kile

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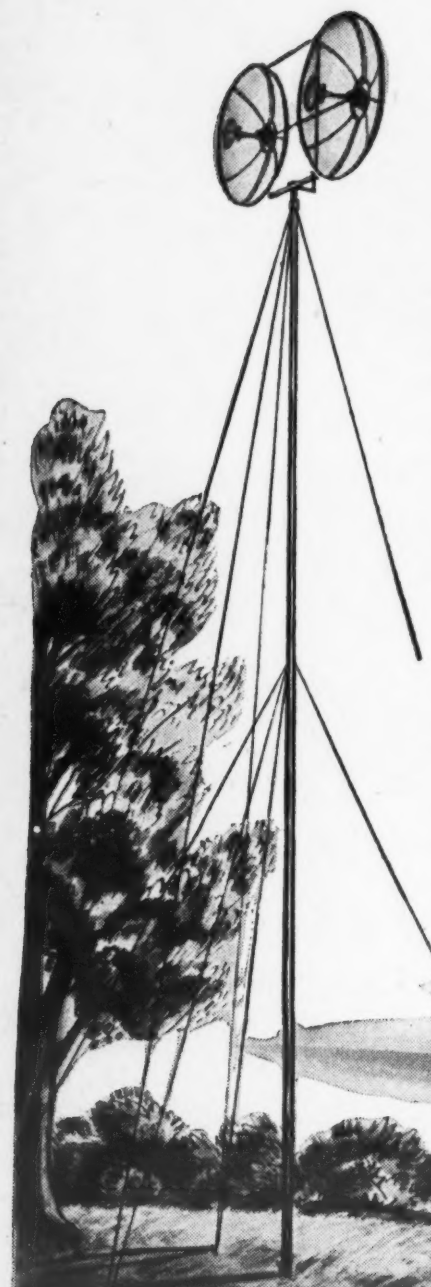
THE COVER

The cover portrait for this issue is of AFCA President William J. Halligan. Mr. Halligan, who was elected at the AFCA 1951 national meeting in Chicago, is president and founder of the Hallicrafters Company.

Photo by Bachrach

You can't cut a MICROWAVE!



As every signalman knows, no field problem can match —for headaches—the job of playing nursemaid to ground wire. Pounded by trucks and tanks, ripped by bulldozers, and shattered by artillery, signal cable is also target "A" for enemy patrols and saboteurs. Keeping tactical communications open has always been costly in manpower, materiel, and transportation.

Working with Signal Corps engineers, General Electric has improved upon basic microwave designs to combine the best features of many. The new ANTRAC 26* is a radio transmitter—receiver and multiplex unit providing eight 2-way voice channels. Built for fixed or truck mounting, it is compact, durable, capable of operating in any weather, over any terrain. Designed as a connecting link in a communication network where laying wire is not feasible, this unit embodies the microwave point-to-point line-of-sight principle. It is one of many new military developments from Electronics Park where microwave systems are a specialty. Here, in the electronics capital of the world, General Electric's aim is to replace muscle with machinery—to make electronics provide us with a vital edge of superiority.

*AN/TRC-26

You can put your confidence in—

GENERAL ELECTRIC

Radio, Alas! Is Here To Stay! — Or

Whither Are We Whencing?

By Arthur K. Ransom, Lt. Col., SigC

Applied Communications Branch, Officers Dept., TSS, Ft. Monmouth, N. J.

Once upon a time I used to fancy myself quite an authority on the subject of Wireless. In 1914 I had operated a licensed amateur station and early in the next decade spent a few years aboard ship as a "Sparks" on several of the Seven Seas. Through the media of such publications as "Electrical Experimenter", "Wireless Age", Hugo Gernsback's "Twenty Lessons in Wireless Telegraphy", Elmer E. Bucher's "Practical Wireless Telegraphy"— with the frequent perusals of the Electro Importing and W. B. Duck Companies' catalogs—I kept well abreast of the times.

I knew, for example, that if the length of my aerial, plus the length of my lead-in, plus the length of my ground lead did not exceed 120 feet, that if my ¼ inch spark coil transmitter employed a Leyden jar condenser not exceeding one quart capacity I would operate close enough to 200 meters wavelength that I would not likely incur the wrath of the Department of Commerce's local radio inspector. That is, unless my decrement exceeded .02%. Or was it 20%? I could never remember because I was not quite certain just what decrement was, anyway.

Diligently I prodded my submissive galena crystal with cat whisker (with frequent recourse to test buzzer) and night after night brought into my earphones symphony of spark and arc from land and sea.

Gone forever is that grand concerto. Gone too are the majestic, crashing synchronous gaps, their modest, hissing "quenched" counterparts, and the chrisping arcs which produced it. Gone too are galena and cat whisker, wavelength and decrement, quart-sized Leyden jars and spark coils. In those never-never days of the past, Wireless was something which appealed to a man's better senses. It satisfied not only his appetite for high adventure in quest of new frontiers; it filled his ears with music and his nostrils with the attar of ozone.

Gone, all gone! Gone because progress reared its ugly head. Progress has come to Wireless and in its wake of devastation has left a new thing longsince called Radio. With it have come new words—meaty, meaningless words spawned in the same sink. Kilocycles and frequencies, microfarads and ceramics, vacuum tubes and transitors.

I know not when the grand old art of Wireless commenced to degenerate and decay, nor who were the high priests that brought about its subversion. Suffice it to say that the Signal Corps clandestinely enrolled itself in this fifth column as early as 1912 when it published a tome entitled "Practical Uses of the Wavemeter in Wireless Telegraphy". The author of this insinuative screed was an obscure Lieutenant J. O. Mauborgne.

Well, let us face up to it. It appears that Radio has come to stay; that Wireless has passed forever from our earthly sphere. Long cold are the embers of its pyre and when the funeral flames leaped high there was no one to render the honor of a suttee.

Yes, Progress has done a tremendous thing, a mighty thing.

Today we use *two* cat whiskers.

* * * *

If this were a movie, the scene would now fade out and after a moment of blackness fade in again. In the new

Radio installation of SS Pastores when she was flagship of Great White Fleet, circa 1918. Left background shows panel type spark transmitter of 2kw quenched gap type. Right center is Wireless Specialty Apparatus Co. so-called double deck receiver, IP-76, model 1914. Next to it is the WSA Co. group tuner, and center are phones and crystal detector. Hot wire ammeter to register antenna current is seen in upper right, with antenna change-over switch beneath it.

scene I would see myself in the radio room of the SS "Metapan" of the Great White Fleet. The year is 1919.

* * * *

"This is a fine ship," I've written home, "and the best I've ever been on." She is my new berth and I am especially happy about the radio equipment. The receiver is a marvel of efficiency and a thing of beauty. Manufactured by the Wireless Specialty Apparatus Company of Boston to designs of 1914 it is the very last word. Officially it is the IP-76 receiver but we call it the "double-decker" for very obvious reasons. The black bakelite case is about forty inches wide, half that in height and perhaps a foot or more deep. The upper half contains a loose coupler which will tune up as high as 8,000 meters."*

Care and Feeding of Crystals

The lower portion of the case houses a somewhat smaller loose coupler (it can cover only as high as 1,500 meters) while the remainder of the space contains some tuning condensers and detector controls. The entire thing positively glistens with dozens of nickle-plated switch points ingenuously arranged so that I can tune to the individual turn on both primary and secondary coils of both loose couplers. There is a unique switching device which enables me to stand-by simultaneously on two wave-lengths!—one on the upper deck, the other on the lower. My detector stand is separate —about six by ten inches—and rests on the operating table where it is handy for convenient adjustment of the cat whisker.

Although the company supplies us with the necessary galena crystals, I prefer to use my own. Several months ago I bought an entire pound of galena crystals. Breaking it into pieces of random size (something about half the size of a sugar cube is best) I have "tested" each morsel for "sensitive spots." You see, there are certain spots on the crystal—and mighty darned few of 'em too—which have some unusual quality. When the cat whisker makes contact with such a spot, you can hear a signal. For adjustment purposes we use a test buzzer. That's just a slightly refined version of a doorbell with the vibrator arm connected to the ground terminal of the receiver. It simulates a signal.

Of the entire pound of crystal, I've kept only one small crumb about the size of a pea. It is a honey. I'll bet there are fifteen or twenty sensitive spots on it and—believe it or not—I know the topography of that crumb so thoroughly that I can set the cat whisker on any one of them almost without using the test buzzer. This is quite important because if you're copying a message and some oaf jars the table, or if the ship pounds into a heavy sea, or if there's a strong crash of static (that's QRN, you remember) it can knock the detector out and then you have to look for a sensitive spot in a hurry. This crystal is my own personal property and I carry it from one ship to another with me. I have a small pillbox lined with cotton for this purpose. In handling a crystal never touch it with your fingers. Body oils will spoil it. I use tweezers. Of course it gets dusty from time to time and must be cleaned. Grain alcohol is best. Just dunk it in the alcohol a few times. Some operators say gasoline or carbona are good too but I'm not willing to take the chance. Ray Green (he's my chief operator) uses soap and water and scrubs his crystal with a toothbrush. He says it works fine but I still think alcohol is best.

Of course there are quite a few kinds of detectors. Of the crystal varieties some require local batteries and others don't. Only a few dry cells, and they'll last for months, but why bother with batteries and a potentiometer to adjust when you don't have to? So that's why I like galena best, no batteries. Of course silicon is good too and it doesn't require batteries either. Then there's the electrolytic detector. I bought one once but I don't think it's as sensitive as the galena and anyway it needs batteries. It has a small graphite cup which holds a drop or two of diluted sulphuric acid. A sort of micrometer adjustment lowers a thin piece of Wallaston Wire down until it just touches the surface of the acid. That's all there is to it. No sensitive spots to look for but you have to adjust it frequently just the same because the acid corrodes the wire away. *AND*, that doggone wire costs thirty-five cents an inch! No, thirty-five cents wouldn't break me but, remember, I get only sixty-two fifty a month (plus biscuits, of course) and I have to buy my own uniforms. The last set of whites cost me almost twelve bucks in New Orleans.

Well, I was talking about detectors. The British have one they called the Marconi Magnetic Detector. I'm not sure how it works but it is in a big box, runs by clockwork, and keeps a thin iron wire belt moving between some magnet pole pieces. They seem to like it but it needs a battery too. And, dont' forget, you have to wind it. We have something else here on the "Metapan" that's quite new. It's called a "Group Tuner" and is supposed to cut down the static. It does, too. Not much, but a little. It has another purpose, however, that I'll tell you about now.

You see, every ship on the ocean is working on 600 meters.* Most of the shore stations we work with are on the same wavelength. So you can see there is sometimes a lot of interference. Well, things would be a lot worse without this group tuner. Some ships are using transmitters with 60 cycles, others use 240, 500, etc. The British liners have something around 800 or 900 cycles and their freighters use a ten-inch spark coil which sounds like about twenty cycles. Then, some of these are straight gaps, others are quenched gaps and there are a lot of rotary gaps—both synchronous and non-synchronous. So you can see that it sounds like an orchestra when you get a dozen ships all working together. Well, this is where the group tuner comes in. It helps me to tune in on the pitch of the station I want just like my receiver lets me tune in on the wavelength I want. I don't know just how it works but I think it's pretty clever just the same.

Well, that about covers our receiver. I want to tell you about the transmitter. It is really the grandest thing yet. The nameplate on the Power Panel says it's a 2 KW job but don't let that fool you. I cranked the generator field rheostat all the way up the other day and put a book on the key while I read the meters. The primary of that old transformer was sopping up 48 amperes and the voltmeter read nearly 120! The hot wire ammeter in the antenna circuit was reading between twelve and thirteen amps and that's what I call efficiency. You'll never get anything like that out of those new Marconi Company sets they're building into panel rigs. How can they expect to get any kind of distance when they cram everything into a space four feet square and eight feet high?

Well, I started to tell you about *our* transmitter. The transformer is a beautiful job built by G.E. It's an open core job and stands on end. About eighteen inches across and four feet high. Ray Green says it puts out 75,000 volts but how can he be sure? I never heard of a volt meter that ran that high. I'll bet it's closer to 100,000—especially since we burned out that one section of the primary and just shorted it out because we didn't have a spare.

Importance of Nickel Plate

The condenser is a new type. It uses compressed air! It's about the size and shape of an old-fashioned washtub with a big electrode sticking up out of the middle. We have a sort of a tire pump which goes with the rig to pump it up. Every once in a while you'll hear it flash over inside. Makes quite a racket when it does. Anyway, that's the signal to get out the pump and get to work. It seems to work all right and I suppose it's as good as Leyden jars, but there's nothing to *see*. I mean I always liked to watch those Leyden jars corona. The spark gap is a big rotary disc set on the end of the alternator shaft. It's what they call synchronous. That means that the teeth on the disc line up with the sta-

**Editor's Note. It is recommended that the reader refer to the Signal Corps Technical Manual "Radio Fundamentals" (TM 11-455) Appendix VI "Kilocycle-Meter Conversion" for a more ready understanding of the Author's antiquated references to frequency.*

**Ibid.*

tionary electrodes at the same instant that the current is on the peak of the cycle. You can see how much more efficient that is than just letting it spark any old time and any old place on the cycle.

The oscillation transformer is the best I've ever seen. It's mounted on a red marble panel about four feet square and there's a knob in the middle of the panel so you can tune the secondary while the set is in operation.

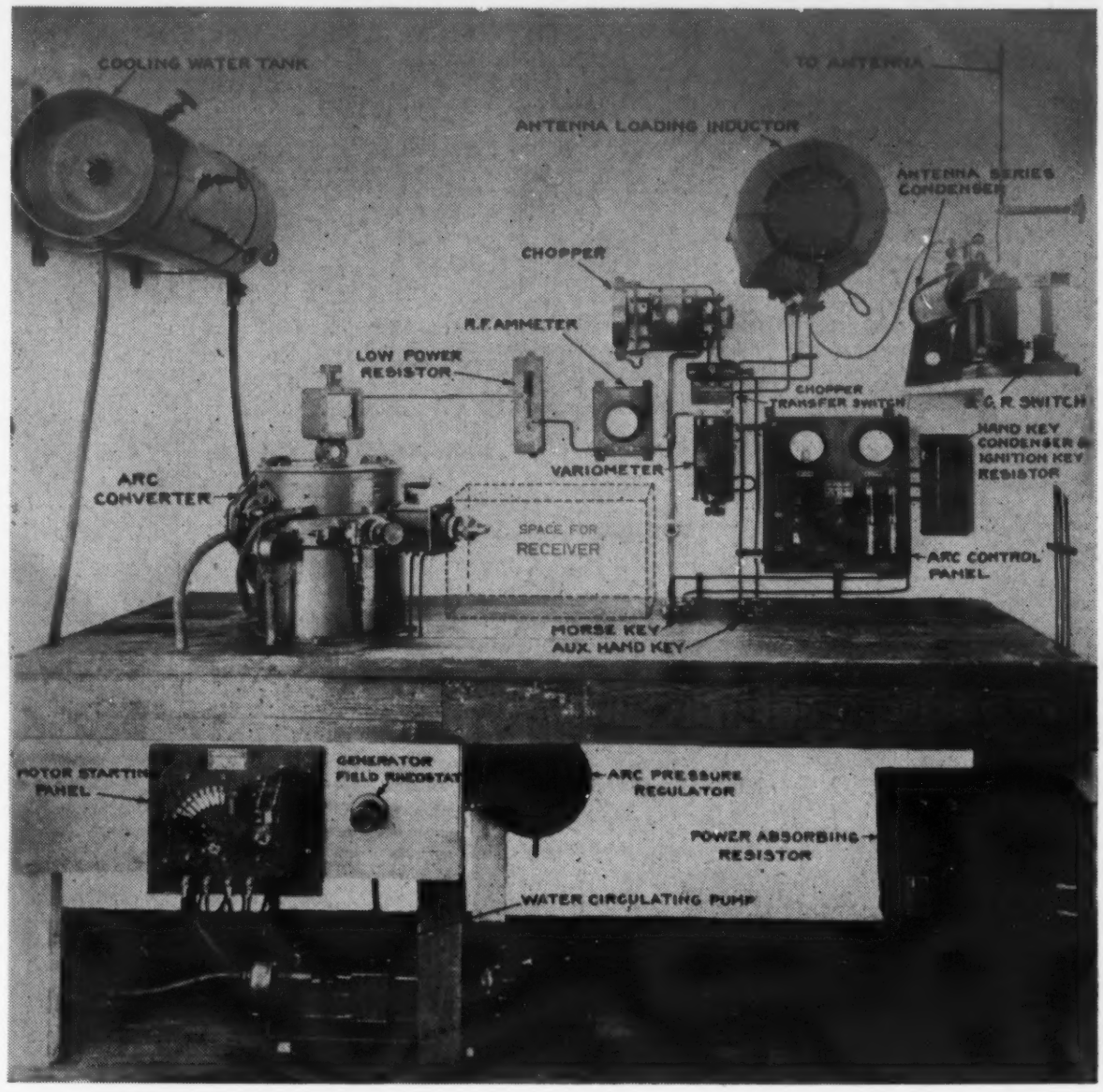
I especially like this installation for several reasons. First, because the set is so new, almost all the brass and copper—like in switches, meter rims, etc. —has been replaced with nickle plate. You may not think that's very important but let me remind you that part of the junior operator's job is to keep the brightwork shined. So, you see what I mean? Also, I like the set because they haven't tried to jam everything into something the size of a trunk. The transmitter occupies a room about eight feet wide and fifteen feet long. There's lots of room aboard ship so why not use it? You get more efficiency by spreading things out anyway. Just use a little more Belden braid for the high voltage lines but that isn't too expensive so whether you have twenty-five feet or fifty strung around, what's the difference. . . . . .?

* * * *

"I've just been assigned to the SS "Sixaola" my letter reads "and she's the best ship I've every been on." . . . . . No more crystal detectors on ship. We have audion bulbs. Three of 'em. One is a detector and the other two are amplifiers. They're in a separate box. The entire installation is built by Wireless Specialty Apparatus Company so that means it's the best. The receiver is a copy of the old Navy set the SE-1420 only it's a big improvement over the Navy rig. It's called the IP-501 and it tunes up to about 20,000 meters!*

The audion bulbs are put in the set through doors in the panels and there are grilles in the doors so you can see if the bulbs are lit. It's too bad that the engineers didn't talk to some operators about this when they were designing the set because any operator could have prevented them from making a rather big mistake. You see, the bulbs burn with a very bright light and it's most annoying to have that striking you in the eyes for the full eight hours you are on watch. It's quite easy to correct this fault, however. We just put some colored transparent celluloid in the peep holes. I think I'll have to write the company about this. They always like constructive suggestions.

I must admit that it's better to use these audions instead of crystals. They are more sensitive, you don't have to hunt for sensitive spots, no test buzzers, and the amplifier is wonderful. It brings in the signals so loud that sometimes you can lay the earphones on the table and read NAA clear across the room. Of course there are the usual draw-backs. You have to use batteries. There's an "A" battery and a "B" battery. In fact, there's two of each. There's a set for the receiver and a set for the amplifier. You have to use separate batteries for each.



Typical shipboard installation of famous 2KW Federal Arc Transmitter, WW I era. Although numerous components are widely scattered and create impression of complexity, operation of equipment was extremely simple and maintenance was nil.

The transmitter is called the Priess-Barth set. It's a 2 KW job and I guess it's good because Wireless Specialty won't fool around with anything which isn't. But the condensers are small aluminum bathtubs not much bigger than cigar boxes. They're called Dubilier condensers after the fellow who invented them. I'm not too fond of the spark gap. It's the quenched type and it doesn't make much noise. Just seems to me that if you expect to get some distance out of a transmitter it has got to have a wallop in it some place and quenched gaps just don't have any. Then, too, it's a panel type set with everything simply jammed into a space about four feet square and six feet high. There's one thing I do like very much. This transmitter has a wave change switch so I can use any one of six different wavelengths. Of course, the company engineer has to tune the set for these wavelengths while you're in port—it takes a lot of instruments like wavemeters and decremeters—but it's handy to have all those wavelengths. I called the "Tivivies" the other night (he doesn't have any wave change switch) and told him I would shift to 450 meters.* I did it and I'll bet it took him fifteen minutes to find me on 450. What a dope!

There is one good thing about this whole installation about which I am very happy. The only brightwork is on the battery-charging panel. That's good, eh? Well, there ought to be some compensation for that quenched gap. I don't think I will ever get used to it—wave change switch or no.

Incidentally, I understand that Independent Wireless has quite a few ships running across the big pond using arc transmitters as big as 20 KW. The "George Washington" has an outfit like that. It was put on right after the war when President Wilson went to the Peace Conference and had to have a powerful set so he would always be sure of contact with shore stations. I'd sure like to work a set like that.

* * * *

I was writing another letter. *"This SS "President Roosevelt" is certainly a fine ship. I guess it's the best I've ever been on."*

I am especially happy with the transmitters (you notice I use the plural). We have two of them. One is a 2 KW Navy Stantard spark set with quenched gap and a wave change station. I don't like it too much although it seems to work O.K. The other set is a 5 KW Federal arc and that really reaches out. We keep in touch with both U. S. and

(*Continued on page 76, col. 2*)

Ibid.

From The President

President Halligan in his first message to the AFCA membership stresses the responsibility of each member to stimulate interest in the AFCA in his own community. The Association must continue to grow in number, he points out, since its very existence depends upon its members.

As I drove to the office this morning I couldn't help thinking again how truly wonderful it is to be an American. Busy mothers at their back doors were shuffling and discarding milk bottles. . . . Spirited school children strained impatiently as they waited for the corner policeman to wave them across the street. . . . Trees and lawns were dressing for summer in the bright morning sunlight. . . . Yes, it's great to be an American!

Where but in America could the Fifth Convention of the AFCA have been so successful? Where but in America could a radio peddler have been chosen to serve as your president during the coming year? Thank you, gentlemen, for the honor bestowed upon me; I'll do my best to prove worthy of that honor.

Certainly our retiring national president, Theodore Gary, and our own Chicago Chapter president, Oliver Read, and his entire staff are to be congratulated for their tireless efforts during the past year. In his first message to Association members Mr. Gary stressed the importance of technical development and a high level of production if we were to meet the needs of our armed services. Now, a year later, we must continue to dedicate ourselves more than ever to those same tasks.

The AFCA, as you know, was founded on a principle of teamwork between military men and civilians to foster the development and use of communications, electronics, and photography, particularly in the national defense. The main speakers at the Convention in Chicago clearly indicated that the most important job ahead of us right now is our national defense program. Our industry today is in a better position to convert to military production than it was in World War II. The phenomenal growth of television, for example, has provided greater numbers of highly skilled workers. Expanded factory facilities and engineering know-how can make possible a speedier, more efficient transition than we experienced in the early 1940's.

I'm happy to know that new AFCA chapters are being organized and that many of the older chapters report increased memberships. Since the very existence of the Association depends upon its members, we must continue to grow in number. Past President Frederick R. Lack said that "*the strength of our Association lies in the interest of its membership and the activities of its chapters. Whether affiliated with a chapter or not, it is with you, the individual member, that the success or failure of this idea rests. . . . It should be a pleasure to be associated with others who have the same principal interests as yourself. Many chapter meetings emphasize good fellowship without losing sight of the serious purpose of the meetings.*"

There is still a tremendous job to be done in building up our membership. Although certain new chapters are being added and student chapters increased, each one of us nevertheless has a very definite responsibility to stimulate interest in the AFCA in his own community.

If we really pitch in on a membership drive then we'll realize to the fullest extent the true meaning of our military-civilian alliance—the basic idea of our AFCA founders.

W. J. Halligan

photos

the camera of H. C. Clark recorded activities at the

AFCA's 1951 Convention at Chicago

1. Visiting members registering at Chicago's Drake Hotel. 2. Industry tours were a feature of the meeting. 3. Inspection trip aboard the Navy's destroyer escort "Daniel A. Joy." 4. Business meetings, one of the first purposes of the convention. Shown here is the directors and council members session. 5. Chicago Chapter's President Oliver Read welcomes the AFCA visitors at the luncheon gathering. 6. A record number of ladies attended the convention.

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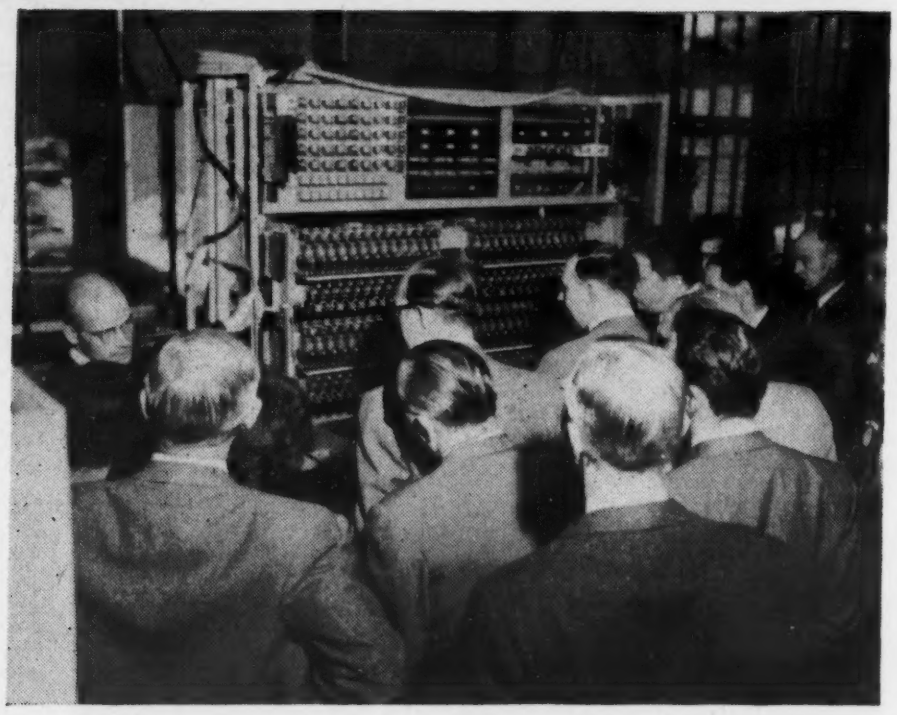
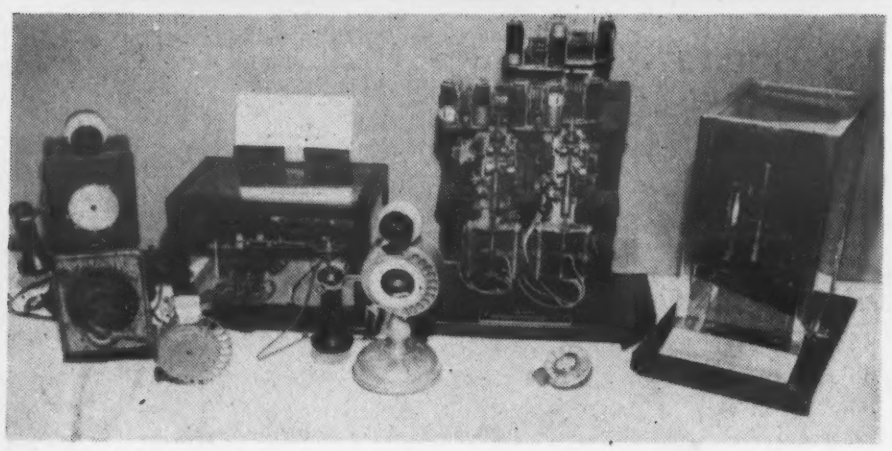
Tour scenes at the AFCA Chicago convention

Above: AFCA group visits the U. S. Navy destroyer escort "Daniel A. Joy."

Left, and down: AFCA members touring the Automatic Electric Company plant see many equipment exhibits of interest, including Strowger automatic toll director, automatic toll ticketing, automatic time announcer, and new and old automatic telephones and dials. Bottom photo shows "ancient" equipment on display. Phone on far left used 1898 model dial.





Below: Group who chose the Western Electric Company for their tour pause for photo outside of W.E.'s Hawthorne Works, the world's largest telephone equipment plant. In lower photo the AFCA visitors are seen watching 101 pairs of wires gathered to form a single cable unit which grows 600 feet longer every minute.

Above: At the Rauland Corp. plant AFCA visitors see TV tube production methods. Top, automatic exhaust machine pumps air out of tube. Center, operator loads gun and bulb in automatic sealing machine which seals gun into neck of tube. Bottom, welding operations on gun assembly of tube.

Above: AFCA convention visitors who chose the Hallicrafters Company for their industry tour also saw television tube manufacture, in addition to Hallicrafters' longtime specialty, the manufacture of all-wave communications receivers, transmitters, and other equipment for radio amateurs.

Below: AFCA groups before the Sentinel Radio Corp. . . . .

. . . . and the Motorola Inc. manufacturing plant tours.

AFCA 1951

An innovation in AFCA national meetings came off with resounding success in the association's 1951 convention at Chicago, April 19, 20, 21. All previous national meetings had been sponsored by the military services, in turn, with military exhibits and shows. This year industry sponsored the meeting for the first time, with attendant manufacturing plant tours.

The obvious satisfaction of AFCA visiting members with the 1951 convention assures that similar industry shows can be planned for any future meeting with complete confidence in offering the member a worthwhile convention visit.

A full day of touring the manufacturing plants, the second day of the convention, took the AFCA visitors through plants of their choosing to watch production of equipments, and components of those equipments, in the fields of their especial interests. Each visitor was given a choice of two tours for the day, one to be made in the morning and one in the afternoon. At the plants of the AFCA industrial group members, in the Chicago area, the convention visitors saw in actual production items of photography and other optical apparatus—aerial cameras, combat cameras, gun cameras, bomb spotting cameras, lenses, gunsights, and radar devices. In electronics and communications they saw manufacturing methods in producing equipments and components in television, radio, radar, microwave, telephone, and automatic control devices. They saw the most modern production methords in the manufacture of these and other items, and they pronounced it an excellent show.

Above: Principal speakers at the AFCA convention. Left, keynote speaker Leslie F. Muter, president of the Muter Co. Center, banquet speaker Robert C. Sprague, president of the Sprague Electric Company and chairman of the board and past president of the Radio-Television Manufacturers Association. And right, Glenn McDaniels, permanent president of RTMA.

Below: Retiring AFCA President Theodore S. Gary and Chicago Chapter President Oliver Read deliver welcoming addresses to the AFCA convention visiting members.

Halligan Chosen President

The AFCA council and directors made the 1951 convention a complete Chicago show with the election of another Chicagoan to the presidency of the association. William J. Halligan, founder and president of the Hallicrafters Company, was chosen to succeed Theodore S. Gary as AFCA president. Taking office immediately at the close of the national meeting, Mr. Halligan is the first AFCA president not having to wait out the "lame duck" period of previous years when new association officers and directors elected at national meetings did not take office until mid-year.

Vice Presidents

Vice presidents chosen by the AFCA council and directors to serve for the next year were Rear Admiral Earl E. Stone, USN, chief of the Armed Services Security Agency of the Joint Chiefs of Staff; Joseph C. Wilson, president of the Haloid Company; Major General Francis L. Ankenbrandt, USAF, Director of Air Force Communications; Major General Kirke B. Lawton, USA, Deputy Chief Signal Officer; and Vernon B. Bagnall, American Telephone & Telegraph Co. vice president.

CONVENTION

New Names For Board

New directors elected were Mr. Bagnall; Harry Austin, RCA Communications vice president on the Pacific Coast; Major General Francis H. Lanahan, recently assigned to SHAPE after four years as commanding general of Fort Monmouth; Thomas F. Halloran, vice president of the General Communication Co. of Boston; Percey Black, Automatic Electric Co. assistant vice president; G. C. Whitaker, president of Graflex, Inc.; Roland C. Davies, editor and publisher of *Telecommunications Reports;* and Ellery W. Stone, president of the American Cable & Radio Corp.

Dixon, Wozencraft Renamed

AFCA Executive Secretary George P. Dixon and General Counsel Frank W. Wozencraft were renamed by the council and directors.

For 1952 the Executive Committee will be composed of George W. Bailey, I.R.E. Secretary; AFCA Past President Theodore S. Gary; President Halligan; Admiral Stone; Joseph C. Wilson, president of the Haloid Company; and W. Walter Watts, RCA vice president, now on leave to the Defense Production Authority.

The nominating committee for the 1951 national meeting was made up of Mr. Bailey as chairman, AFCA Past President Frederick R. Lack, Harry Austin, Oliver Read, and W. H. Mansfield.

Rearmament Keynotes Meeting

Industry's part in the swelling national rearmament effort, including the manifold complex problems imposed on industry by the needs in rearming, formed the theses of the major addresses delivered at the convention, and shaped the discussions during the three forums on communications, electronics, and photography.

Pointing up the role of the AFCA in improving liaison between the armed services and industry, to assist in solving the problems of supply, retiring President Gary in his addresses at the convention keynote luncheon and at the annual banquet, stated that the AFCA "can become a beacon in a world beset by confusion and darkness, guiding our members first in execution of patriotic duties which are now so pressing, and afterwards leaving our country a heritage in which we can all participate."

Recalling the "increased pressure that has been brought to bear on so many of our members by the dramatic and far-reaching events of the past year," the outgoing president noted that the association members had responded to their country's need in a manner which reflected "courage and wisdom of the kind that our founders must have foreseen when they organized the AFCA."

President William J. Halligan, elected at the 1951 Chicago Convention to head the AFCA for the coming year, is congratulated by retiring President Theodore S. Gary.

Below: William C. DeVry, president of the DeVry Corporation, and moderator of the forum on photography at the AFCA Chicago Convention, chats with retiring AFCA President Ted Gary.

Urges AFCA Purpose Review

Mr. Gary, whose tenure of office was marked with the continuation of the tradition of strong leadership set by his predecessors, urged that the membership read and re-read the AFCA's outline of its purposes. For now, more than ever, he emphasized, "do we need to put it to practical use." That outline, he pointed out, is the "cornerstone of the foundation of the association. It is built on the firm basis of mutual interest, sustained and strengthened by a bond of fellowship, training and understanding in fields which are becoming increasingly vital to the welfare of our country."

Sprague Address

At the annual banquet, in the principal address of the AFCA national meeting, Robert C. Sprague, chairman of the board of the Radio-Television Manufacturers Association, emphasized the increased demand on the electronics industry in the rearming of the nation and cautioned that the armed services should realize that "we must have a healthy and robust civilian industry if we are to have a strong and well-prepared military machine when it is needed."

Mr. Sprague also warned that industry must be kept sound during the present transition period so as to be able to retain its engineers and technicians "without whom neither our great production nor our famed technical advances would have been possible."

As an example of the increased need for electronic equipment, Mr. Sprague

Above: Left, Fleming W. Johnson addresses Electronics Forum, and right, William C. Henry speaking as panel member on Wire Communications Forum.

Below: Top, Col. William H. Gaekle answers questions in Wire Communications Forum. Center, Dr. Maurice E. Strieby, James H. Kellogg (moderator), and Col. Gaekle, forum members on Wire Communications. Bottom: Forum on Photography. L to R: Vere O. Smith; William C. DeVry, moderator; O. H. Coelln, speaking; and Capt. William C. Eddy, USN (ret).

quoted a government official who had stated that since 1943 the number of electronic devices in large aircraft has multiplied four times. Other public statements, he said, indicate that some airplanes incorporate electronic equipment which costs $500,000 per airplane.

The importance of electronics to our national defense makes for concern in another aspect of the present rearmament program, Mr. Sprague stated, in that "the military load is not, for a variety of reasons, evenly distributed throughout the industry." In the event of all-out war, he said, the electronics industry would have to be expanded by a ratio of at least two to one, even though it has already doubled since World War II, and "it would be dangerous," in the meantime, "to permit any significant number of manufacturers of either end equipment, or components, to fall by the wayside."

Muter In Keynote Address

Leslie F. Muter, president of the Muter Company, in the keynote luncheon address, made a strong appeal for the armed services to change the procurement regulations so that equipment and component contracts would be granted to the manufacturing companies which have competent engineering experience and staffs and production know-how based on their participation in supplying the armed services during World War II. He expressed the hope that the situation during the recent peacetime years of awarding contracts to companies with virtually no experience in defense requirements and military procurement would be remedied by a revision of the armed services procurement regulations on competitive bidding.

Forums Stress Rearmament Problems

The national rearmament effort also dominated the first-day forums of the convention on communications-electronics-photography. Moderator of the forum on photography was William C. DeVry, president of the DeVry Corporation. Panel members were O. H. Coelln, editor and publisher of Business Screen Magazine; Captain William C. Eddy, USN (ret.), president of Television Associates, Inc.; and Vere O. Smith, civilian training aids specialist for the Ninth Naval District.

Electronics

AFCA's new president, William J. Halligan, was the moderator of the forum on electronics. Members of the discussion panel were Captain Henry J. Bernstein, USN, Navy liaison officer stationed with the Signal Corps Engineering Laboratories, Ft. Monmouth, N. J.; Fleming W. Johnson, director of manufacturing of the J. P. Seeburg Corporation; and John M. Sanabria, vice president of American Television, Inc.

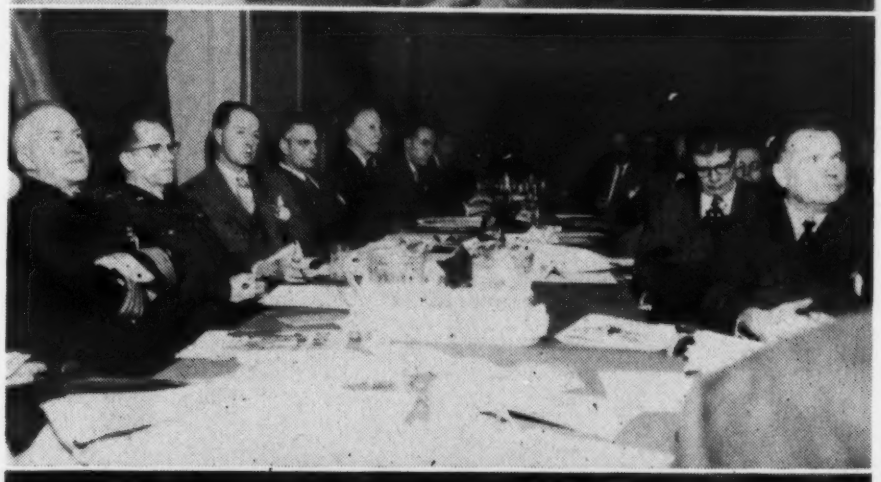
Captain Bernstein, who is also the director of the armed services' Electro Standards Agency at Fort Monmouth, was the principal speaker at the electronics forum. Speaking on the vital importance of standards of electronic components which are reliable and can be interchanged in the equipment of the three services, Captain Bernstein emphasized that reliability of components and equipment means the quality and performance of military apparatus will be attained in combat operations. He disclosed to the AFCA forum that within six weeks his agency hopes to prepare in a handy reference form for the use of design engineers the important information from the military specifications on all of the components going into the equipment of the armed services. He declared that in this task the ASESA had been greatly assisted by the comments of the electronics manufacturing industry.

Wire Communications

The forum on wire communications was conducted by James H. Kellogg, president of the Kellogg Switchboard & Supply Company. Panel members were Colonel William H. Gaekle, chief of the industrial service division of the Office of the Chief Signal Officer; William C. Henry, president and general manager of the Northern Ohio Telephone Company; and Maurice E. Strieby, executive assistant of the long lines department, AT&T.

Directors and Council Meeting

From top: AFCA Executive Secretary George P. Dixon presents annual report for fiscal year 1950-51. Second photo, directors and council members listen attentively as nominating committee chairman George W. Bailey (center photo) submits nominees for officer and director posts for coming year. In next lower photo are seen Past President Frederick R. Lack, Director. J. Harry LaBrum, retiring Presiednt Theodore S. Gary, and Executive Secretary Dixon. Bottom photo, Director LaBrum makes bid on behalf of Philadelphia for 1952 AFCA convention.



In his address to the wire communications forum, Col. Henry, who is president and general manager of the Northern Ohio Telephone Company, emphasized that the telephone industry, "which has grown and developed over a period of more than 75 years, inspired by a record and tradition of public service," will fully meet its obligation of military requirements an dthe objectives of national defense in the present emergency as a task of first importance. "The policy of the entire telephone industry, both the Bell System and the Independent segment, in a national emergency is clear and unmistakable—the military needs of the nation must always come first," Colonel Henry, who served with distinction in the Signal Corps during World War II and is now one of the leading coordinators and representatives of the Independent telephone industry with the armed services, stressed in his talk before the forum.

For most practical purposes, Col. Henry declared, April 19, 1951, for the telephone industry might very easily be April 19, 1942, early in World War II, except that the industry faces the present emergency with a handicap that did not exist in 1942.

In another address before the AFCA wire communications forum Colonel William H. Gaeckle, chief of the industrial service division of the Signal Corps Philadelphia Procurement Agency, described Signal Corps contract activities and forecast some future procurements. Speaking for Lt. Col. Kenneth M. Gonseth, chief of the industrial mobilization branch in the Office of the Chief Signal Officer, who had been scheduled to speak at the forum but was prevented from attending because of an attack of influenza, Colonel Gaeckle said that the Signal Corps, under its mobilization production procurement schedules expects to place during the 1952 fiscal year orders estimated at $309,350,518 with the wire communications manufacturing industry.

Navy Vessel and Air Warning Center Visits

Though the AFCA's 1951 convention was principally an industry show, the meeting was not entirely without a touch of the armed services, since the tours in Chicago included a visit aboard the Navy destroyer escort *Daniel A. Joy*, which is the largest Navy vessel on the Great Lakes, and is equipped with the latest types of radio-communications and radar apparatus in its role as a command communications ship, and a visit to the country's largest civil defense air warning control center, an Air Force operation, located in Chicago's Museum of Science & Industry.

Philadelphia In 1952

Next year the AFCA national meeting will again be held under military sponsorship when the Navy will be host at Philadelphia. At the directors and council business session in Chicago, AFCA Executive Secretary Dixon reminded that it would be the second consecutive convention which the Air Force had relinquished, and he pointed up the good sportsmanship of Major General Francis L. Ankenbrandt, Air Force Director of Communications, in passing up two meetings.

The decision to hold the 1952 meeting in Philadelphia was arrived at partly due to the eloquent plea of Director Harry LaBrum on behalf of his home town. AFCA Past President Frederick R. Lack helped the motion along by dryly suggesting that the council and directors settle on Philadelphia "before we get snowed under with superlatives about that city."

On the comment concerning military sponsorship of the 1952 convention, Mr. LaBrum expressed the viewpoint that it

The feminine accompaniment

Left: Included in the ladies' tours was a visit to Colleen Moore's famous doll house.

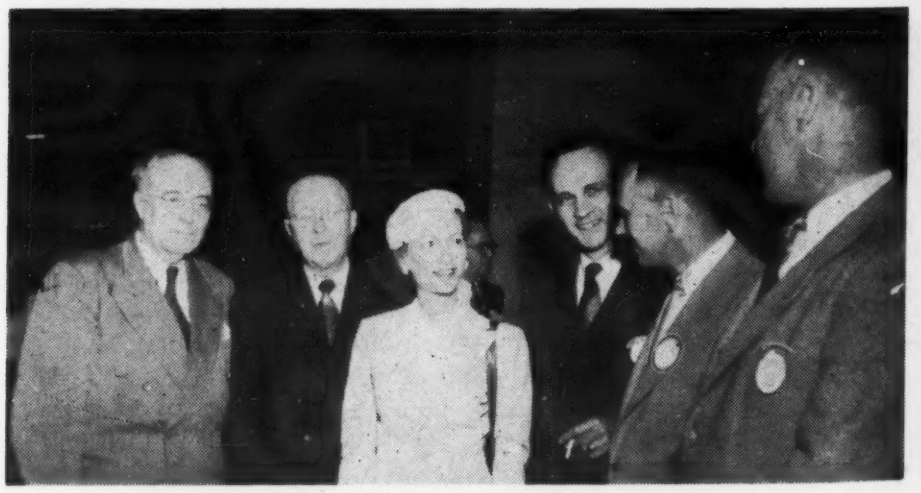
Right: Mrs. Theodore S. Gary, chairman of the ladies entertainment committee.

(This page gently ignores the men)

Above: Mrs. Allen S. Crane, Mrs. Michael Higgins, Mrs. G. E. Brewer, and Mrs. J. J. Clerkin.

Mrs. T. S. Gary (above) and Mrs. George P. Dixon (below) surrounded by AFCA members.

Above: Mrs. Arthur A. Crawford also gets encircled with AFCA members, while the gentleman below (who looks like an Air Force major general) pulls a switch and surrounds himself with ladies. They are, L to R, Mrs. L. H. Warner, Mrs. Gary, and Mrs. Frank Meade.



Below: Mrs. Gary's table at the keynote luncheon.

should be regarded as a joint meeting, since each of the military services has large installations in, or close by, Philadelphia. It was felt, however, that the Philadelphia meeting next year will be mainly a Navy show.

Council And Directors Meeting

The council and directors at the business meeting, presided over by President Gary, heard the report by Executive Secretary Dixon for the fiscal year 1950-51. The year had been a good one, he reported, with a trend toward increasing membership. Several new chapters have been activated, and there is some hope for the reactivation of several quiescent chapters. Student chapters are also increasing in number. But though there has been an increase in membership, the executive secretary expressed the belief that the membership of the AFCA should be many times larger than it is at present.

Number of Directors Increased

Recommendations made by the executive committee at its January 1951 meeting, to increase the number of directors on the AFCA board and the number of members composing the executive comimttee, were submitted by Secretary Dixon. It was voted by the council that these proposals be recommended to the board of directors for ratification. Subsequently ratified by the board, the changes provide for an increase in number of directors from 24 to 32, in number of members composing the executive committee from 5 to 7, and require a quorum of the executive committee to be 4 instead of the former 3.

Vote of Thanks To Retiring President Gary

Following the election of national officers and directors and the reading of Secretary Dixon's report, a vote of thanks, made by motion of Admiral Earl Stone, was extended to Mr. Gary for his service to the association as its president in the past year, a term in which the organization continued to strengthen in its role of coordinator between industry and the armed services.

Chapter Presidents' Meeting

Indicating a new high-point of interest on the part of AFCA chapters in association matters, the Chapter Presidents' conference, which followed the Convention Keynote Luncheon, produced the liveliest discussion of any similar conference in the association's history.

A considerable portion of the annual meeting of the chapter presidents, and other representatives, was given over to earnest examination into methods whereby AFCA membership, both individual and industry member groups, might be increased. One contribution to this discussion was the thought of Philadelphia Chapter President Harry A. Ehle that the chapters, for their part in the effort, have a "merchandising, advertising, public relations" job to do. "Examining our souls," asserted Ehle, "would reveal that we have not done a public relations job."

"Why Should I Join" Answer

The query "Why should I join the AFCA?" is an important phase of the membership expansion problem, Boston Chapter President Thomas F. Halloran pointed out, and much depends upon an adequate definition of AFCA's purposes when answering the question. National AFCA Past President Frederick R. Lack, sitting in on the conference, stressed to the chapter officers that it should be pointed out in answer to such inquiries that the association is a highly important way of "continuing the team" of industry and armed services which otherwise for lack of a cohesive element, such as AFCA, draws apart at times. The AFCA past president, referring to the armed services and industry high ranking personnel at the Council and Directors meeting, noted that "in this morning's meeting you had everybody you could want to get anything done in our field in national defense."

AFCA Executive Secretary George P. Dixon reminded that Mr. Lack had superbly outlined the background and purposes of the AFCA in his first presidential letter to the members on the "From the President" page, when that department was inaugurated in the February 1950 issue of SIGNAL.

The Hardworking Registration Crew

The AFCA registration tables at Chicago's Drake Hotel were the hub of activity for the first day of the convention where members centered to make arrangements for the events of the three-day meeting. Here also was where endless questions were asked and answered, for what convention visitor has never had to ask for information.

The hardworking registration crew, right, deserves an AFCA vote of thanks. And here they are, L to R, standing: Florence Scott, Muriel Benewick, Louise Wilke, Dolores Warnecke, and Daisy Tani. Seated, Tillie Hasson, V. D. Houlihan, and Lucille Galow.

Chapter Of The Year Hot Race

Results of the Chapter of the Year contest were announced at the Chapter officials meeting, and certificates were presented by Secretary Dixon. The keen interest on the part of the chapters in the annual contest was reflected in the comments of the winning chapter representative and of the runners-up. Said Secretary C. A. House of Sacramento, the winning chapter, "We tried for five years to get this, and next year we will try again." President Fred E. Moran of the Pittsburgh Chapter, which lost by a nose in the photo-finish finale, noted that there is "another year coming," and that "we almost made it." Boston Chapter President Halloran said ruefully. "This isn't the way we planned it, but—" For last year's winner, Augusta-Camp Gordon, it's Presi-

An always pleasurable dividend for the association member in national meetings is the small informal gathering. Here many members get together who because of time and distance barriers are rarely, and in some cases never, able to otherwise meet . . .

dent Norman J. Kinley remarked, "Can't win 'em all." In announcing the winners, Executive Secretary Dixon described the "final months' hectic, close race," in which Sacramento and Pittsburgh were 10th of a point apart near the end. The outcome was not certain until the final day when Sacramento came in with 43 new memberships, clinching the title.

Philadelphia Promises Surprises In 1952

President Ehle of the Philadelphia Chapter, bringing up the matter of next year's AFCA national meeting, for which Philadelphia had been decided on as the site, in the morning Council and Directors session, forecast an excellent meeting, and stated that "we know we have some surprises for you." Mr. Ehle suggested that AFCA group members should allow business travel for their personnel to the convention. He also proposed that the meeting should be coordinated with the Institute of Radio Engineers. The latter suggestion was made as a motion, voted on, and carried. The Philadelphia Chapter, Mr. Ehle said, will highly welcome any suggestions beneficial to next year's annual meeting.

One of the small groups pausing for an informal chat during the AFCA 1951 national meeting at Chicago included the AFCA's newly elected president and the retiring president. Seen above, L to R, are: L. H. Warner, president of Automatic Electric Sales Corp.; Mrs. Theodore S. Gary; AFCA President William J. Halligan; Mrs. L. H. Warner; and retiring AFCA President Gary.

The Day Of Tours

The second day of the convention was the day of tours, and the AFCA members spent all of that day visiting manufacturing plants and watching modern production methods in their particular fields of interest.

Bell & Howell Company

At the Bell and Howell Company AFCA visitors saw the plant of a pioneer in the development of professional photographic equipment. This highly important manufacturer in the rearmament effort may be called upon again to match its performance of World War II when it built precision optical and electronic equipment for the armed forces—lenses, gunsights, top secret radar devices, the see-in-the-dark sniperscope, gun cameras, bomb spotting cameras, combat cameras, and other precision equipment.

Motorola Incorporated

At Motorola Incorporated the AFCA members saw another manufacturing plant potent in producing armed services equipment. During WW II Motoralo developed the famed handie-talkie communication units, as well as radar and microwave equipment.

Teletype Corporation

The touring members were shown the manufacture and assembly of the many parts which go into printing telegraph apparatus at the Teletype Corporation. A subsidiary of the Western Electric Company, this manufacturer has been producing Teletype apparatus since 1906.

Automatic Electric Company

At the Automatic Electric Company the convention visitors saw the manufacturing methods of a company which has supplied the armed services with communication equipment since before World War I. The Strowger automatic telephone is familiar equipment in army posts, arsenals, air fields, naval stations, and on naval vessels of all classes. Automatic Electric also produces electrical control apparatus for industrial, engineering and public utility companies, telephone apparatus for railroads and pipe line companies, private telephone systems of all types, electrical and communication devices for aircraft and airways.

Sentinel Radio Corporation

The Sentinel Radio Corporation displayed for the AFCA members its methods in producing television sets and radio receivers. Television accounts for about 80% of its present business. During World War II this company produced more than $38 million worth of equipment for the armed services, and is now preparing to again convert to military production such share of its facilities as may be needed.

(*Continued on page* 24)

. . . with each other and talk leisurely about association affairs and other matters in their particular vocational field of interest. The camera recorded for these pages some informal gatherings at the AFCA Chicago Convention.

AFCA're See Defense Filter Center

One of the tours set up for AFCA Convention visitors in Chicago included a visit to the country's largest civil defense air warning control center, set up in the Museum of Science and Industry in Chicago's Jackson Park off the shore of Lake Michigan.

At the center, Captain William Garry, USAF, officer in charge, showed the AFCA members the plotting boards and the extensive communications equipment necessary to bring in reports from civilian ground observers and to coordinate operations with other similar centers, with Air Force radar observation posts and ground control intercept stations.

Requiring over 20,000 civilian volunteers, manning some 700 field posts, and the center itself, the Chicago filter center is a demonstration of civil defense in action *now*. The center alone needs 1500 civilians for various 4 hour shifts. There are 26 centers already set up throughout the country and these are expected to increase to 50 to 60 by the end of this year.

Heart of the air warning filter center setup is the country's telephone system. The chief coordinator for the American Telephone & Telegraph Co. in the civil defense program, Herb Shroll, who was among the AFCA members visiting the filter center, pointed out that the U. S. air warning program is fortunate in having available the greatest telephone system in the world, that nowhere else could such a program be undertaken without enormous installation of telephones.

In action, calls coming in from field observers in the defense system will have top priority. An arrangement for handling calls has been set up so that an observer can have use of his telephone within 15 seconds of picking it up to place an emergency call. Thorough precautions have been taken against sabotage of the system. The telephone numbers of volunteer observers are registered, and the telephone company has certain phones for use only by the filter center.

The importance of the ground observer is pointed up by the Air Force in that there are gaps in radar coverage due to the curvature of the earth. In addition, the ground observer would fill in in case of malfunctioning of radar equipment.

The Chicago center goes into four states, Indiana, Illinois, Iowa, and Wisconsin, covering an area of 65,000 square miles.

A common misconception of a filter center's purpose, Captain Garry of the Chicago center pointed out, is that it is set up to assist in the protection of the area within which it itself is located. As a corollary of this misconception, the question is asked, how can the warning system bring into effect timely enough counter-measures in view of the great speeds of present day aircraft? But the center *does not* protect its own area, Captain Garry stressed. The centers protect the areas of *other* centers.

Left: Some of the Keynote Luncheon and Annual Banquet tables at the AFCA's 1951 National Convention, Drake Hotel, Chicago.

Webster-Chicago Corporation

Nearly complete manufacture was seen by the AFCA visitors at the Webster-Chicago Corporation, for this Company fabricates nearly all of the parts and components used in its end products. During both World Wars I and II Webster-Chicago produced precision parts for aerial cameras, field telescopes, ordnance guages, dynamotors, voltage regulators, magnetic recorders, parts for radar equipment and arming devices for bombs.

Hallicrafters Company

Of especial interest to "hams" among the AFCA tourists was the Hallicrafters Company, for this manufacturer has long specialized in the production of equipment for "hams." A large phase of its operation is now devoted to television receivers. A feature of its present plant design is its flexibility of production. A complete production line of up to 130 people can be changed over from one type chasis to an entirely different type, position by position, with less than one minute's delay between the last unit of the production run and the first unit of the next.

Western Electric Company

At the Hawthorne plant of the Western Electric Company AFCA members saw the largest manufacturing plant of telephone equipment in the world. Its land area covers more than 200 acres, and its personnel numbers more than 18,000. Western Electric functions as a manufacturer, purchaser, distributor, and installer gor the Bell Telephone System. The AFCA visitors at Hawthorne were shown the construction of large automatic switching frames and the manufacture of wire and cable drawn from copper bars.

Rauland Corporation

Some of the most modern methods of mass production of television tubes were seen by AFCA members at the Rauland Corporation. This company's plant is highly mechanized with practically every operation being performed by intricate special machinery developed specifically for the purpose. All phases of the operation were shown the AFCA visitors, including every branch of tube technology.

A Successful Meeting

And that was the AFCA's 1951 industry sponsored national meeting.

As has been pointed out, every member should attend the meetings every year it is possible for him to do so, because as with any democratic organization it is the individual who makes the organization what it is, IF he takes part in its affairs. But even though the member does take keen interest in association business matters, and attends a meeting mainly because the meeting is taking place, he is still interested in what the display, or show, phase is going to be like. And as to that, now that we have the experience of an industry sponsored meeting we can do it again and know, with conviction, that the member's convention visit is going to be enjoyably interesting.

Ladies at the Convention

The planning for the 1951 AFCA Convention included in its aims bringing about a greater attendance of members' wives to the national meeting. The planners were eminently successful in their efforts, for a record attendance of ladies was accomplished, as the photos on the opposite and other pages testify.

Mrs. Theodore S. Gary, wife of AFCA's retiring president, served as chairman of the entertainment committee for the ladies of the convention.

LAVOIE

The Business A Wavemeter Started

By Alvin F. Rymsha

The large and growing facilities of Lavoie Laboratories, Inc. give little indication that a short 12 years ago only a basement workshop comprised the entire plant of the company. Stephen D. Lavoie's idea for a precise UHF wavemeter has since expanded into a development and manufacturing concern employing almost five hundred engineers and skilled craftsmen.

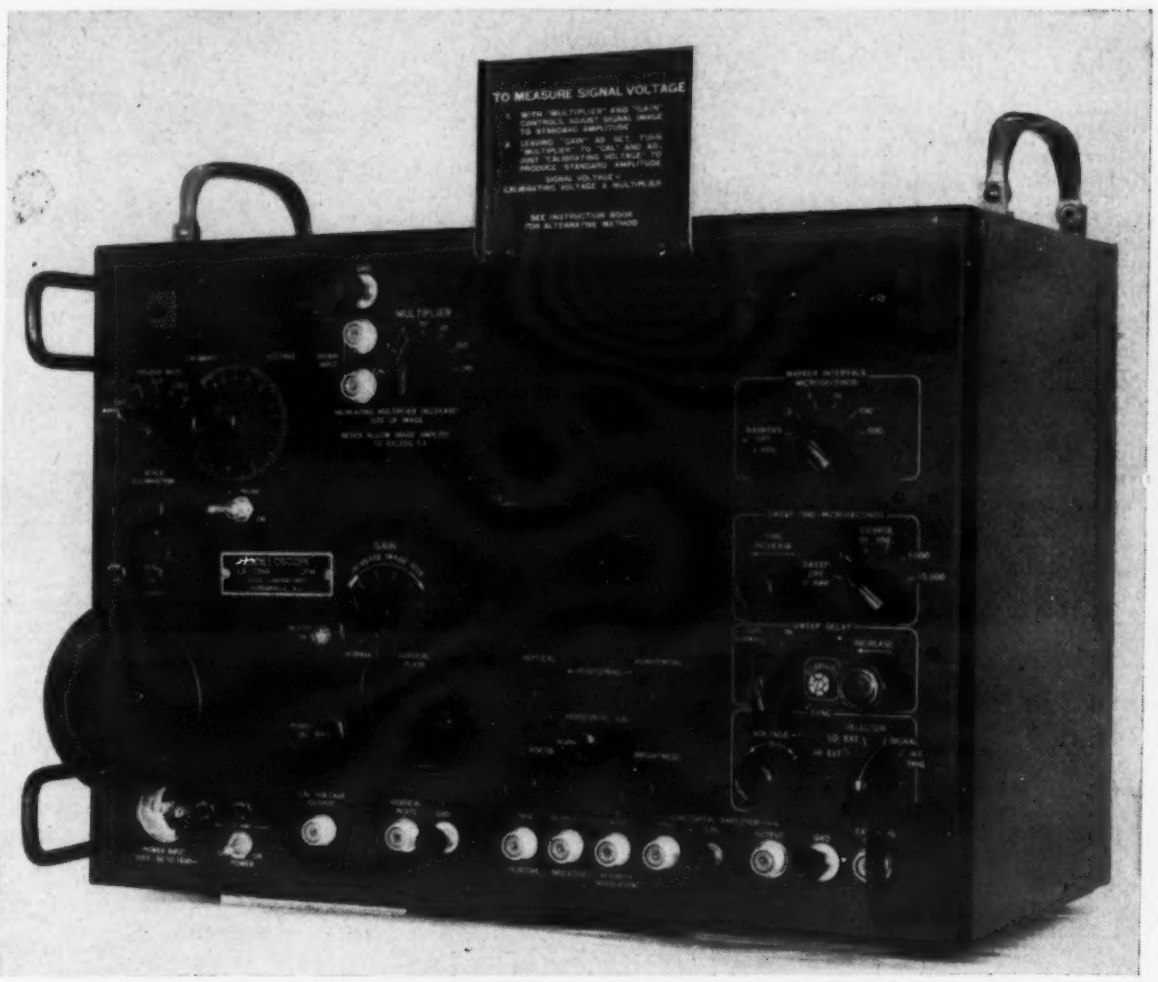
The nucleus of the original wavemeter was formed in the late 1930's, while Mr. Lavoie was employed at Wright-Patterson Field, in Dayton, Ohio. Means had been found to generate appreciable quantities of power in the 700 megacycle band, but no measuring instruments were available which combined the advantages of precision and portability. Mr. Lavoie resigned his position and set up a small laboratory in his home to develop a precision wavemeter. The first successful model was completed and a new company was born. The present model differs from its predecessor only in external appearance and manufacturing refinements.

The U. S. Navy purchased thousands of Lavoie wavemeters (known as the TS-127/U) during World War II, and there is still a steady demand for new instruments. At present, models are manufactured which altogether cover the entire range from 100 to 3000 megacycles.

The success of the Lavoie wavemeter established Lavoie Laboratories in the electronics world, and after a brief stay at Long Branch, New Jersey, the plant moved to Morganville, New Jersey. The present buildings provide over two acres of manufacturing and laboratory floor space, and are located in the center of a large agricultural area. The Signal Corps laboratories at Fort Monmouth are only 18 miles from Morganville.

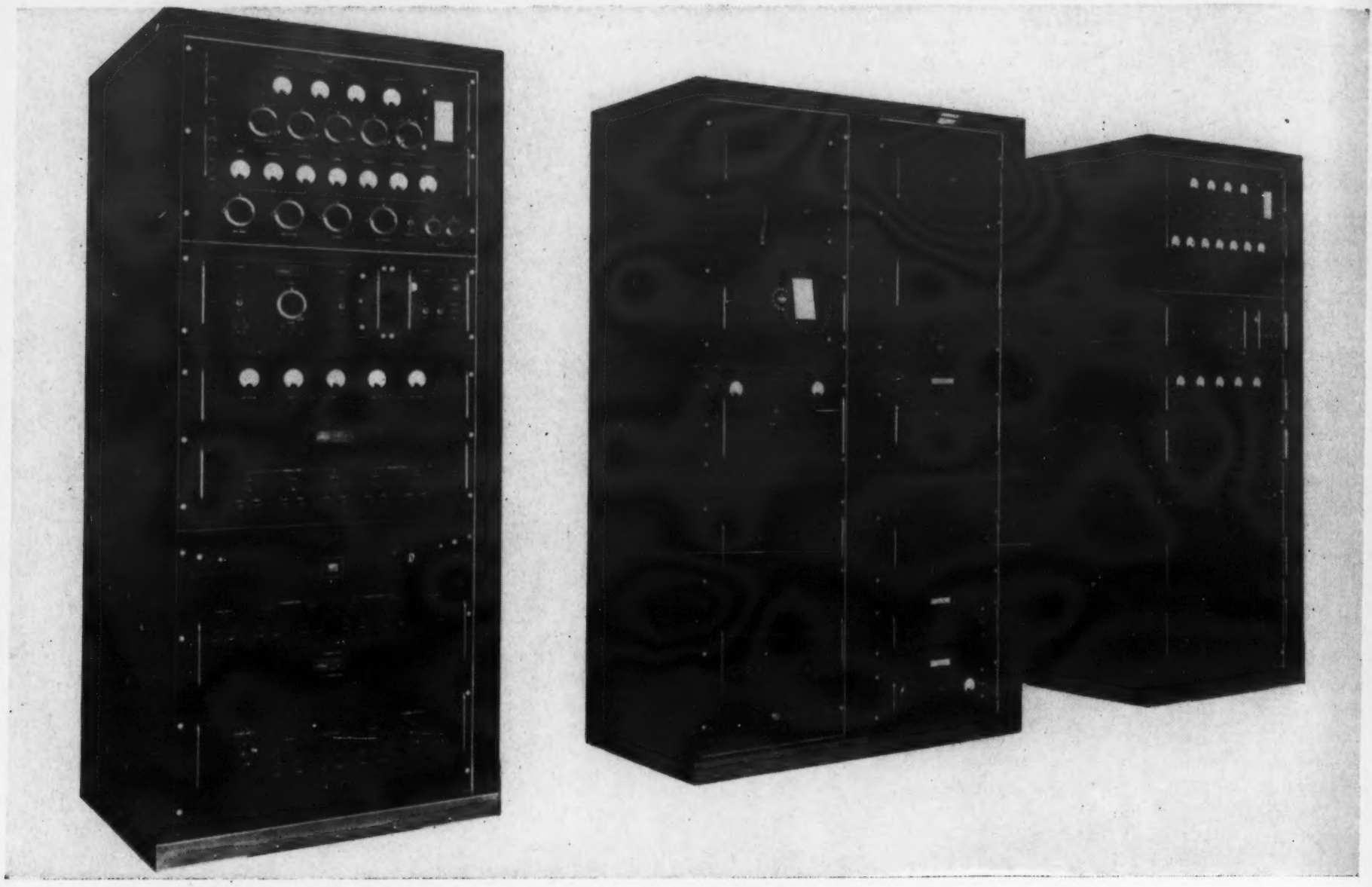
Above: The Lavoie UHF Wavemeter

Below: LA-239A Oscilloscope



Model 51 Crystal Impedance Meter

Although the company has specialized in UHF development, it has not restricted its activities to that field. Outstanding among its recent accomplishments was the manufacture of several thousand TS-239 oscilloscopes. This type was first developed at Bell Telephone Laboratories, and is characterized by wide frequency response and high gain. The scope is particularly useful in pulse work, since its design permits quantitative analysis as well as qualitative observation. A timing-mark generator facilitates the measurement of the duration of pulses or other signals, and a calibration circuit assists in measuring the amplitude of signals to quite a high degree of accuracy. The frequency response is flat from 10 cy-



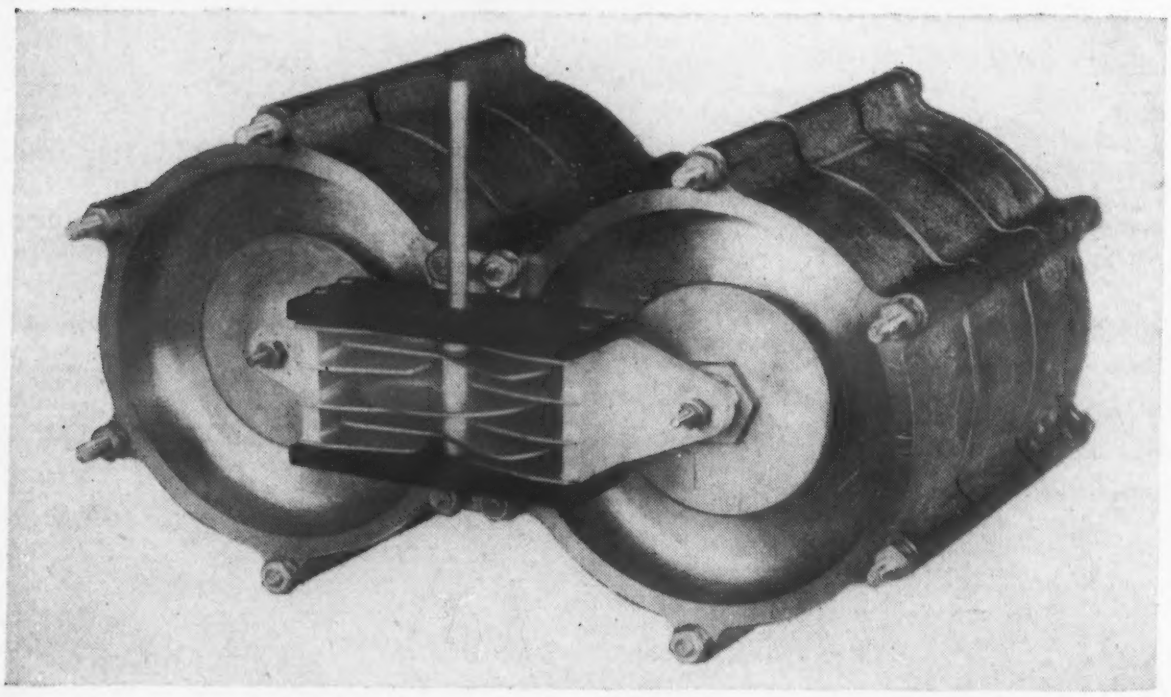
Above: The Omnirange transmitter set up for operation.

cles to three megacycles, and higher frequencies may be observed at reduced amplitude. The equipment is currently available in both civilian and military models, the only difference being in the government inspection required for the TS-239. The civilian version is known as the LA-239A.

Another major achievement was the development and manufacture of omni-direction radio range transmitting equipment for the U.S. Air Force. Omni-Range equipment has, of course, been built before, but the AN/FRN-12 developed by Lavoie Laboratories was the first air-transportable system built, and the first to be manufactured in such a compact assembly. One of the major improvements which enabled the bulk to be reduced was a compact resonator for the 112-118 megacycle band. Generally, high power transmitters would require the use of a long tuned-line tank which would occupy a great deal of space and require heavy shielding. The resonator used in the Lavoie omni transmitter is self-shielded and may be bolted to the chassis.

For those unfamiliar with the omni range system, it may be briefly stated that it is a radio range system designed as a navigation aid for aircraft. The pilot of the plane may determine his compass bearing from the station by simply setting a dial in the plane. By maintaining this bearing, the plane may fly a true course to the station. Measurement of the bearing depends upon the comparison of the phase relationship of two 30-cycle signals.

The development of this compact 112mc resonator aided in reducing the bulk of omni-range transmitter equipment, making it possible for Lavoie to build the first air-transportable system.



During a brief interlude shortly after the war, Lavoie Laboratories produced a few commercial items of the AC-DC variety. However, the great bulk of work during the last four years has been military electronic equipment, particularly communications, navigation, and radar systems. One of the more important facets of the Labs' activities has been the development of precision frequency meters. Differing from the Lavoie wavemeter in operation, frequency meters AN/FR-4, 5, and 6 are being developed for the Signal Corps. The three meters cover the range of from 100 kilocycles to 500 megacycles, with an accuracy of 0.001%, or one part in 100,000. The instruments are portable and occupy about one cubic foot of space. All the instruments are calibrated in such a way that no computations other than the simple addi-

(*Continued on page* 74, *col.* 3)

THE VARISCAN PRINCIPLE

a new facility in graphic transmission

By Dale O. Collup

Radio Techniques Branch
Naval Research Laboratory,
Office of Naval Research

The *Variscan* television camera principle, a technique developed at the Naval Research Laboratory, promises, by electronic means, to eliminate the cumbersome lens turret from a television camera and to provide easier camera control. It provides continuous electronic variation of the viewing angle, and hence of the apparent magnification, as well as electronic aiming of a fixed camera. Since these functions can be controlled by wire or radio link, from a remote point, it follows that a great deal of latitude is gained in camera location and operation.

Variscan has a military application as a training aid. The use of television in mass teaching is becoming more widespread, since by this medium top-quality instructors with the best visual aids can be brought before a large audience. The studio and camera techniques for this service were recently studied at the Navy Special Devices Center, Sands Point, Long Island, New York, where television is being evaluated as a means for military training. Thus far, the limited size and resolution of the reproduced image has introduced peculiar limitations on the charts, mockups, and cutaway types of visual aids used by the instructor, but some distinct advantages are apparent nevertheless.

In demonstrating a piece of equipment, for example, an over-all picture of the device is usually shown first. Then the camera is "dollied in" for a close-up, or another camera must be switched in for a close-up view. Because the dollying technique requires smooth coordination between the dolly-man and the cameraman, it is difficult to use effectively. Switching cameras for a close-up shot causes the audience to lose orientation on all but the simplest devices. By contrast, the Variscan technique applied here gives the same effect as the best coordinated "dollying in" operation, yet requires no optical refocusing and can be effected from the control room. Even the most experienced instructors should appreciate elimination of the distracting effects of moving men and cameras.

Military Research Benefits

There are also uses for this system in the field of commercial television. This is an example of civilian benefits arising indirectly from military-sponsored research. By utilizing the Variscan principle, television cameras can be mounted inconspicuously at vantage points in a studio or stadium, while aiming, cuing and switching can be accomplished in the control room. In a studio pickup, this arrangement results in a cleaner studio appearance and a more closely integrated engineering control.

Television studio at Navy Special Devices Center, where the educational aspects of television are now being explored. Here expert Navy instructor explains a piece of gear. In simplified operation of complex studio such as this the Variscan principle shows special promise.

In operation, the Variscan camera has many of the performance characteristics of a conventional camera equipped with a Zoomar lens. The main differences are in the method of control and the limitation of the system. While the Zoomar provides variable optical enlargement, the Variscan accomplishes enlargement by electronic means. Conversion of the ordinary camera to Variscan involves addition of no elaborate or bulky equipment but merely a rearrangement of existing electronic controls and provision of a simple pantograph for remote steering.

Like the conventional camera, the Variscan camera employs an optical system to focus the scene of interest on the camera tube. This optical system views the entire area to be televised. A means is provided for expanding and contracting the area scanned by the electron beam in the camera tube. A close-up shot is then obtained by scanning only a small portion of the scene, and an over-all picture is had by advancing the sweep amplitudes to sweep the maximum area. In addition to variable magnification, "aiming" of the camera can be effected by manipulation of the centering controls for the camera tube.

The loss of definition from the camera under reduced scan conditions, of course, cannot be ignored. The limits over which the scanning can be varied without readjustment of other parameters in the image orthicon must be determined before a practical design can be made.

Another factor which must be considered is the effect resulting from "burning in" of the normal raster. Scanning beyond the limits of the normal raster size, after "burning in" has occurred, produces a definite tone-shading at these limits. It remains to be seen if this effect will become noticeable under the normal conditions encountered in Variscan operation.

Even considering the possible effect of these, as yet unmeasured, factors (now under further investigation at the Naval Research Laboratory), it seems clear that the Variscan system offers a number of immediate advantages in cost and convenience to both military and commercial television.

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Left: WW II view of Sperry Gyroscope's plant at Lake Success, L. I. Company purchased from government entire 2,118,000 sq. ft. on 144 acres in Oct. 1950. The United Nations Secretariat has used the administration building (in foreground) and a portion of the plant as headquarters since 1946.

SPERRY GYROSCOPE COMPANY

Again this important division of the Sperry Corporation is answering the Nation's call to mobilize

Not all eyes will turn away from Lake Success, Long Island, this May and June when the last of United Nations' Secretariat personnel move to their new headquarters in Manhattan. The eyes of military planning and procurement agencies can be expected to remain in sharp focus on the headquarters of the Sperry Gyroscope Company Division of The Sperry Corporation. Here a number of important manufacturing and engineering projects under way carry high mobilization priorities.

Sperry Gyro, with approximately a half a billion dollars worth of defense business on the books today, is no stranger to the call to mobilize. Since inventor Elmer Sperry placed his first gyro-compass aboard the Navy's battleship *USS Delaware* in 1911, this company has continuously worked closely with most every military organization. Its feeling of responsibility to the country's security has been heightened by its contributions in three emergencies. Hence its forty years of industrial history has been so characteristically marked with summons to military mobilization that it has been observed with near accuracy that even its commercial products have a military potential.

In creating a portrait of Sperry Gyroscope Company, two character lines must be given due prominence. One characteristic results from its close tie to the armed forces. In short, it follows that when the military expands Sperry mushrooms. Inversely, when hopes of everlasting peace are highest, Sperry must turn to commercial pursuits yet keep an inventive nucleus at work on new things which would be needed in case a new emergency should arise.

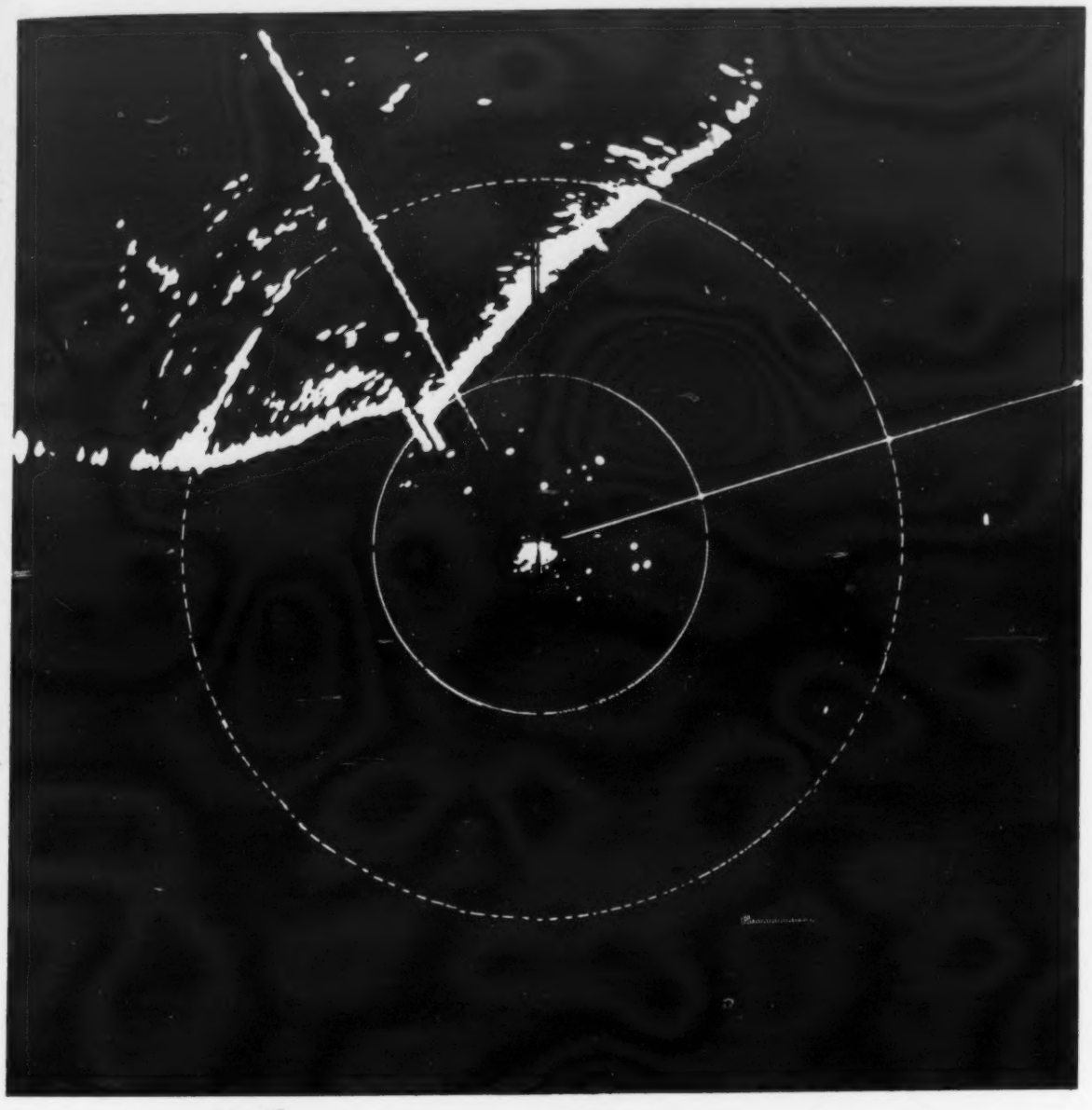
Compared to most industrial organizations this inventive nucleus is kept proportionately high. This second Sperry characteristic has been responsible for an organization trait—concentration upon making existing instruments, controls and systems obsolete.

Modern flight instruments and air navigation traffic control systems must meet rigid requirements for all-weather operation. Here with ceiling near 50 ft. and visibility at 165 ft., Sperry flight research DC-3 shoots landing to obtain performance data.

The Decade 1935-45

To see how Sperry Gyroscope, with these particular characteristics, meets the years of economic and military emergency, the decade 1935-45 makes an interesting case history. In the year 1935, when the economic fears of the depression began to blend with the fears of war, the tight-knit Sperry force totalled 900. As defense and preparedness programs initiated demands for modern equipment it began to appear that all of the developments in

which Sperry had participated during the depression might suddenly and simultaneously be needed in quantity. For example there were antiaircraft directors and searchlights for the Army; gyrocompasses for the Navy; gyro instruments, automatic pilots, bombsights and aircraft armament for the Air Corps. Commercial products, all pertaining to sea or air transportation, would also be needed for essential use in transport.



Left, upper: Radar photograph showing operation of Sperry model TB-140 ramark currently being evaluated by U. S. Coast Guard. Operating omni-directionally on 0310 mc., it is indicated on the ship's radar scope as a broken radial line or bearing as above at Cape May, N. J. Ship's heading flasher is radial line at right.

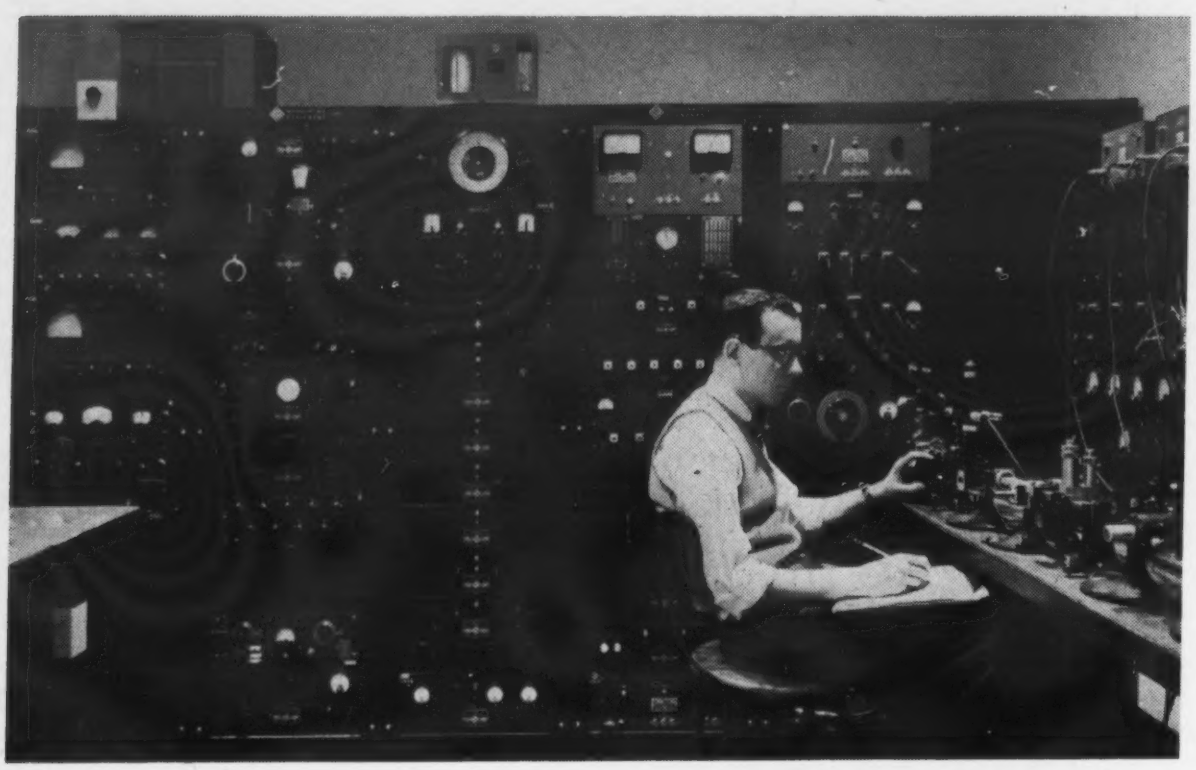
Lower: The same Cape May ramark compared to nautical chart shows ship's position in center. Ramark transmitter is large black dot on ramark bearing line; arrow is true north; ship's head, at right is 72 degrees.

As early as 1937 plans were started for producing complex equipment in larger than experimental lots, a new factory design was prepared, and methods for expanding production from 1's and 10's to hundreds and thousands were worked out. An outstanding scheme was a carefully organized subcontracting system utilizing educational orders whereby Sperry engineers and shop men aided new subcontractors through their first production of Sperry-designed items.

By Munich in 1938, the company had doubled, and it had doubled again by the start of World War II in 1939. In 1940 the company's personnel had expanded to five times what it had been in 1936. Due to the subcontracting system its 1940 production was 10 times the 1936 figure. Pearl Harbor made it quite clear that performance at this level would be far from enough. It was then that a number of prime contractors were given large production contracts to produce equipment to Sperry's drawings with starting aid through technical assistance.

The success of these prime contractors was what might have been expected from such a "who's who of industry." To name a few, The Chrysler Corporation successfully produced gyro-compasses; the Ternstedt Division of General Motors turned out thousands of gyro-horizons and directional gyros. The Ford Motor Company produced antiaircraft directors; A. C. Spark Plug and Eversharp Pencil Company, Inc., made automatic pilots. While The National Cash Register Company fashioned airplane computing gunsights, the Crosley Corporation made Navy gunsights and the Package Machinery Company made a special small gyrocompass for landing craft.

In 1942 Sperry began occupancy of its new Nassau plant of two million square feet at Lake Success, Long Island. With this facility, its original Brooklyn plant, eight other leased manufacturing plants, and space in a score of other metropolitan area locations, its employment reached a peak nearing 33,000 in 1943. These, plus an estimat-



This frequency standard, deriving its accuracy from government station WWV, is among many instruments Sperry uses to meet critical specifications in all radio developments.

ed 32,000 on subcontractors' payrolls and even more with prime contractors brought the total figure of producers of Sperry equipment to well over 100,000.

That, in brief, is what developed from a small nucleus of about 600 men who comprised the Sperry Gyroscope Company in the depression. It was a nucleus which consisted not only of a group with the know-how in building the equipment but also of a group of research and development engineers with a background of continuity in gyroscopics, servo mechanisms and computing devices. The group had also been quick to adopt electronic techniques, so that this new art spread from product to product and established an electronic flavor to a large portion of Sperry endeavor. Replacement of the old trolley-and-contact system in the gyro-compass with an electronic amplifier was one of the first applications of electronics for amplifying torque, the beginning of electronic servo systems. Obviously, then, the group was particularly adept at obsoleting present equipment by designing for the future.

Post-War Reconversion

At the end of this 1935-1945 decade came the end of the war as well. Unlike so many companies, reconversion at Sperry did not mean turning quickly to production of items for which there had accumulated a pent-up customer demand. Sperry products, obviously, existed in great piles of war surplus. Should Sperry turn to other fields or proceed to obsolete existing equipment in its own fields with new designs and broaden its field with new techniques and services? It decided to push forward vigorously in its chosen fields, and again realigned its organization about a nucleus of approximately 6,000 people in 1946.

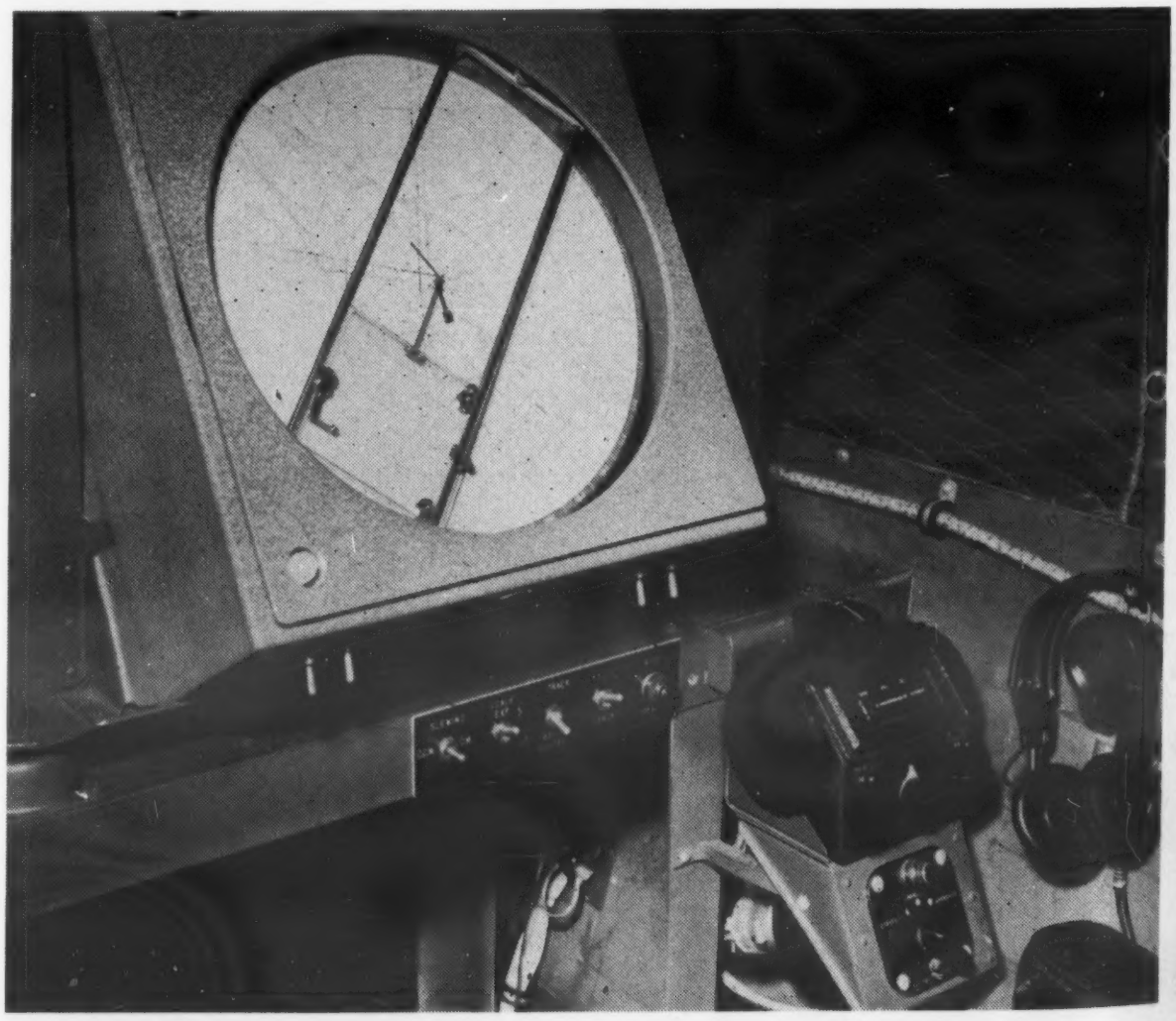
Since that date it had made a number of outstanding commercial contributions to marine navigation, aircraft instrumentation, and special electronic components. And, inasmuch as most of Sperry's commercial products have a military potential, many of these are now in quantity production as mobilization items. Moreover, Sperry's postwar developments for the Army, Navy and Air Force are now responsible for a large portion of the company's backlog.

Two commercial marine products have been markedly successful—radar and loran. In developing a commercial marine radar, Sperry thought itself particularly qualified. The company was "at home" on the bridge of a ship; it knew marine navigation problems. Since introducing a 3 centimeter equipment in 1947, many hundreds of them have been installed throughout the world on ocean liners, fishing fleets, Great Lakes' ore carriers, river towboats, harbor tugs and workboats and private yachts. In addition it has successfully adapted its radar to shore-based harbor surveillance projects in Long Beach and San Francisco, and is currently participating in a similar project for the Port of New York Authority.

Shortly after production of loran for the Navy was halted in 1945, Sperry introduced the first direct-reading loran to provide commercial operators with a simple, easy-to-operate receiver-indicator. Successful trials led to its installation on passenger and cargo ships, fishing trawlers, military transports and Coast Guard vessels of many types. By early 1951, several tanker operators with vessels heading North from the Caribbean were using Sperry loran to follow maximum currents in the axis of the Gulf Stream and add knots to their vessels' speed.

Newsworthy addition to the family of automatic steering systems is the Magnetic Compass Pilot introduced to the marine trade in 1949. This equipment brings to the fisherman, yachts-

Moving map indicator installed in remote control station of C-54 records flight path of aircraft operating on Sperry's 5000 mc Rho-Theta terminal area traffic control system now being evaluated by USAF's all-weather flying division. By using A-12 Gyropilot controller at right pilot can fly any combination of straight or curved track drawn on facsimile map in the master indicator.



man and work boat operator the advantages that the Gyro-Pilot brings to large craft. With a controller mounted on a standard magnetic compass, the captain simply "dials" any course desired. His vessel turns to the course dialed and holds it steadily. Steering is accomplished through electric drum-type engines or a hydraulic power unit or ram.

In aircraft instrumentation postwar, Sperry continued in its pioneering role with such headliners as the versatile, all-weather A-12 Gyropilot,* the Gyrosyn* Compass, the Zero Reader** and the engine analyzer. In the face of limited military forces, each was developed primarily as a revolutionary aid to commercial aviation. Today all are in quantity production for the Air Force and the Navy, beneficiaries of the Sperry trait of obsoleting the old through development of the new.

Automatic Flight Aids

The electronic automatic pilot is one of the most significant aviation developments in recent years. In civil aviation, blueprints for the all-weather airways of the future call for precise control of planes within closely-defined flight paths. For military aircraft, there are the rigid requirements of the bombing run or the high-altitude, long range missions which are best met by the electronic robot. For missiles, rockets and uninhabited aircraft, the role of automatic control is one of marked importance.

The A-12 Gyropilot and its automatic approach control component for guiding aircraft to the runway in response to instrument landing system signals is in world-wide service on many domestic and foreign airlines, on numbers of corporate executive planes and several military types. It has been selected to provide automatic flight and approach control for Boeing's B-47 Stratojet bombers. The modern Gyropilot is the outgrowth of various efforts to attain automatic stability for airplanes. Three early historical Sperry projects are noteworthy. In 1910 Elmer Sperry, working with Stanley Y. Beach, developed a 30-pound gyroscope to stabilize a Beach monoplane. Lawrence Sperry, son of the founder, demonstrated his pioneering in spectacular fashion in 1914. He won 50,000 francs for his stable airplane in a French contest by flying "no hands" an automatically controlled flying boat above the Seine. In 1916, Sperry engaged in its first "guided missile" program, a project described as "an automatic aerial torpedo, a passengerless aeroplane, capable of flying a desired distance on a course, true and predetermined, except for deviations due to direction by wind, and of descending to earth and exploding a heavy explosive charge upon impact with the ground." These Navy-sponsored missiles flew with Sperry automatic controls and led to later radio-directed missiles for the U. S. Air Service and British Air Ministry.

A primary standard 30 megacycle attenuator developed by Sperry's measurements equipment engineering section with cooperation of the National Bureau of Standards. It attracted considerable attention at the annual IRE Convention.

Direction-sensing and indicating component of the A-12 Gyropilot is the Gyrosyn Compass. This gyro-stabilized compass, which is essentially a directional gyro synchronized with the earth's magnetic field, is a standard steering reference for many commercial and military aircraft. Military demand in the United States and Canada for Gyrosyns has made their production one of high priority at Sperry Gyroscope.

The Gyrosyn is likewise an important component of the Zero Reader, another priority production project at the Lake Success plant. It has often been stated that among aircraft instruments no other has created such widespread interest and acclaim. It caused such a stir because for the first time a human pilot could follow one simple indicator and fly and navigate an aircraft manually with a degree of accuracy precision and ease approaching the performance of automatic control. Developed in cooperation with the Air Force's All-Weather Flying Division and the Air Transport Association, it has been chosen as standard equipment for at least three of the new all-weather jet fighters. In addition it is in service on domestic and international airlines and a host of executive airplanes.

With the introduction of four-engine aircraft, the task of discovering the cause of engine malfunctions became increasingly difficult. Many of the modern planes have as many as 168 cylinders—any one of which can be the cause of engine trouble. With the Sperry engine analyzer (developed with PAA engineer John E. Lindberg, Jr.) the flight engineers get a continuous visual analysis of the complete aircraft power plant during flight. From a luminescent oscilloscope he can detect, locate and identify ignition and vibration malfunctions in engine operation.

Outstanding airline use of the Sperry analyzer has been the fleet installation by Pan American World Airways. For example, PAA, in its first year of operation with the analyzer on 14 Constellation Clippers, saved $165,000, or $11,772 per aircraft. Recent quantity Air Force orders, following adoption of the analyzer for B-50 and B-36 bombers, would indicate that this electronic trouble-shooter is close to becoming a standard necessity as a maintenance tool. It is also showing increasing promise as a cruise control device for extending the range of strategic bombers.

In addition to somewhat standard types of aircraft and engine instrumen-

*Trade Mark, Reg. U. S. Pat Off.
**Trade Mark Pat. Pending.

tation, Sperry devotes much talent and energy in the field of air navigation and traffic control. Four significant projects, in recent years sponsored by the USAF, have been made public. One is a 5000 megacycle microwave instrument landing system, the second and third are an omni-directional radio range and distance measuring equipment for guiding multiple aircraft within the terminal area around an airport, and the fourth a computer which shows the pilot on a moving map position-indicator where he is now, where he is headed, and where he has been. A similar computer is being developed for the Civil Aeronautics Administration.

Much of Sperry's familiarity with electronic techniques stems from the klystron tube. Beginning in 1939 the company sponsored its development, hailed then as "the most important advance in radio since the triode." The Sperry klystron was the first practical source of continuous wave microwave energy. Besides generating and amplifying microwaves, in receiving them it produced an intermediate frequency which was easily handled by conventional circuits. It was immediately recognized as an answer to problems in aviation, shipping, communications and the military.

Klystron Use Expansion

It was this need which first claimed the klystron. Radar, for example used the tube extensively. The demand became so great that Sperry licensed leading electrical companies to manufacture them in quantity. Through usage the name klystron rapidly became generic for any velocity-modulated, ultra or super-high frequency tube, so in the public interest, Sperry permitted the use of the name by all manufacturers.

Capt. John C. Wenzel of Seatrain, Texas with the Sperry Mark 2 loran receiver which he claims has been invaluable in cutting running time to a minimum.

Working on one of the 175 different varieties of electronic chassis manufactured each month at the Lake Success plant

With peace, the klystron's use expanded to such commercial applications as microwave links for television, telegraph channels, and supervisory control for railroads, power, oil and gas pipe line companies. In addition, military developments in radar, communications, air navigation and traffic control called for klystron with greater powers and new frequencies. Development of million-watt tubes is making radically new devices feasible.

Introduction of the klystron opened new band frequencies for which test and measuring equipment had to be developed. The company's pioneering in microwave measuring techniques led to Microline* instruments which include every type of device essential to precision measurement in every microwave band.

Present Activity Summary

Well within the bounds of military security, it is permissible to take an overall look at Sperry Gyroscope Company and complete its portrait by summarizing its current, major manufacturing and engineering activities. The major fields in which its manufacturing division is now engaged, in order of their magnitude, are as follows: U.S. Army Ordnance projects; bombing navigational computers; aircraft instrumentation and controls (compasses, attitude and directional gyros, Zero Readers, engine analyzers, automatic pilots and approach controls); guided missile activity; aviation ordnance (gunsights and ordnance radar); naval ordnance; marine, aeronautical and special electronics "commercial" items (the word commercial is in quotes as most items have a military potential and all serve vital industries.)

Sperry's engineering division is presently engaged in the following fields, again in order of magnitude: guided missile activity; bombing systems; naval navigation instruments; ground ordnance projects; airborne sight project; naval ordnance; special aircraft control projects; miscellaneous (such as air navigation and traffic control work, engine instrumentation, and various ordnance and special electronics activity).

Among the activities listed above, it is natural to expect considerable emphasis upon ordnance as Sperry. The company has played a continuous part in the development of naval, ground and air fire control. It has applied techniques in gyroscopics, automatic computation, data transmission, servo mechanisms and radar — all fields in which the organization specializes. Sperry pioneered in such things as the antiaircraft searchlight, the sound locater, the universal antiaircraft director. remote power control systems, and radar. Among well known company contributions in World War II are such other projects as bomb-sights, USAF ball turrets and automatic computing gun sights, the Navy's Mark 14 gun sight, and microwave search and interception radars.

Two of Sperry's large assignments in ordnance which have been made public are the production of the complex control system for the Army's "Skysweeper" gun and production of the radar-directed, automatic gun-bomb-rocket sight for the Air Force. Skysweeper, the outcome of an Army-Ordnance development, is designed to engage aircraft at supersonic speeds both day and night. The airborne gun sight has considerably enhanced the offensive power of jet fighters and interceptors. It is proving quite successful in action in Korea.

This, with deliberate brevity in discussing its military assignments, is the Sperry Gyroscope Company Division of The Sperry Corporation. With its 12,000 employees at work on a growing backlog of important projects, Sperry Gyro is as ever a prominent resident of Lake Success, Long Island.

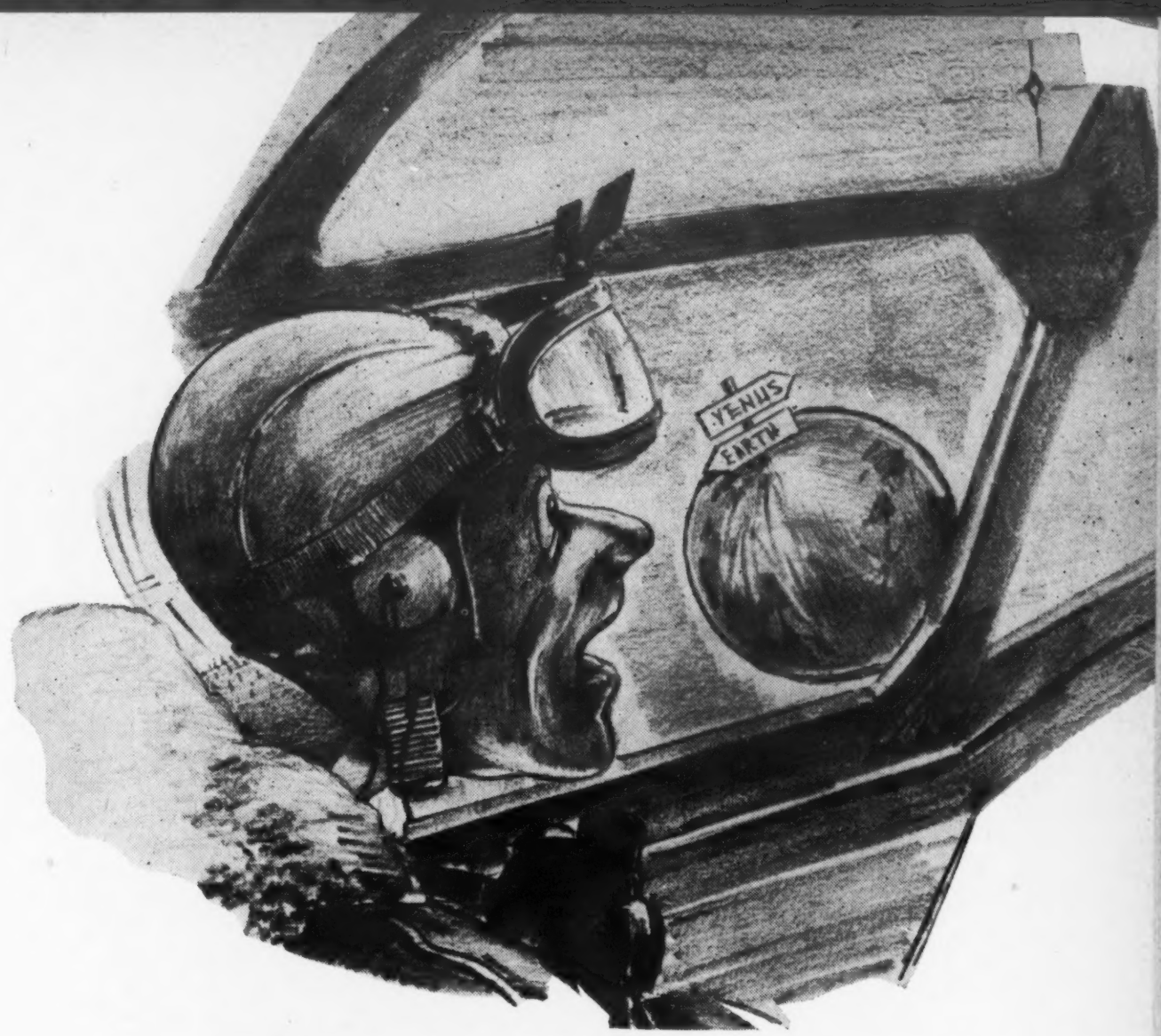
*Trade Mark, Reg. U.S. Pat. Off.

the war's toughest assignment

Harold A. Zahl
Narrator

B. H. Christensen
Illustrator

This anecdote was taken from a collection of unpublished narratives prepared immediately following the close of World War II. The story is based on real wartime happenings. The author and artist, however, apologize for the obvious embellishments both in the text an din the illustrations. In preparing the narrative, the first person was used as a literary convenience and should not be taken as implying direct author participation in the sense suggested.



He didn't get suspicious until he passed the moon.

A few days after I arrived I knew my assignment was going to be on the unusual side. The small Pacific island was being run precisely according to the rules of the Academy. The commanding officer, to whom I was named assistant, was a grizzled old warrior of the old school. At times I even thought he preferred to think in terms of sailing vessels, cavalry—and while it actually never happened, I would not have been too surprised had the Old Man given me a lecture on the advantages of attack using the Roman phalanx instead of modern infiltration methods, fox holes, and the like. Oh, we had modern weapons, lots of them—guns with the latest directors, aircraft, radar, IFF, and the like. But the Old Man remained suspicious and enjoyed nothing more than taking to task anyone who talked "push-button-war" to him—of course, the atomic bomb had not yet been used.

"Out here it's still man against man," he would say, "why, Vinegar Joe Stillwell had to fight like in the French and Indian Wars, with guns and knives. I'll use the new stuff—but I won't depend too much on it!"

One night I was in my bunk and the phone rang. "Sir," came the message, "the searchlight crews have a spherical object in their beam which looks like a Japanese balloon!"

You remember those days when everybody looked to the west for signs of the airborne intruders which were being released by the thousands—paper balloons made buoyant with hydrogen and set to float at 20,000 feet in the prevailing west-to-east winds and carrying explosives fused to explode on reaching the ground. With these gadgets the Japs were bolstering up their home front morale, but hoped also to do damage in our Pacific coast states, particularly setting large forest fires.

"See if you can pick this one up by radar," I ordered, "but be sure to get a positive fix with the optical gear. Call me back at the C.O.'s. I'm on my way over right now."

"Right, sir," came back, and I hung up and stepped outside.

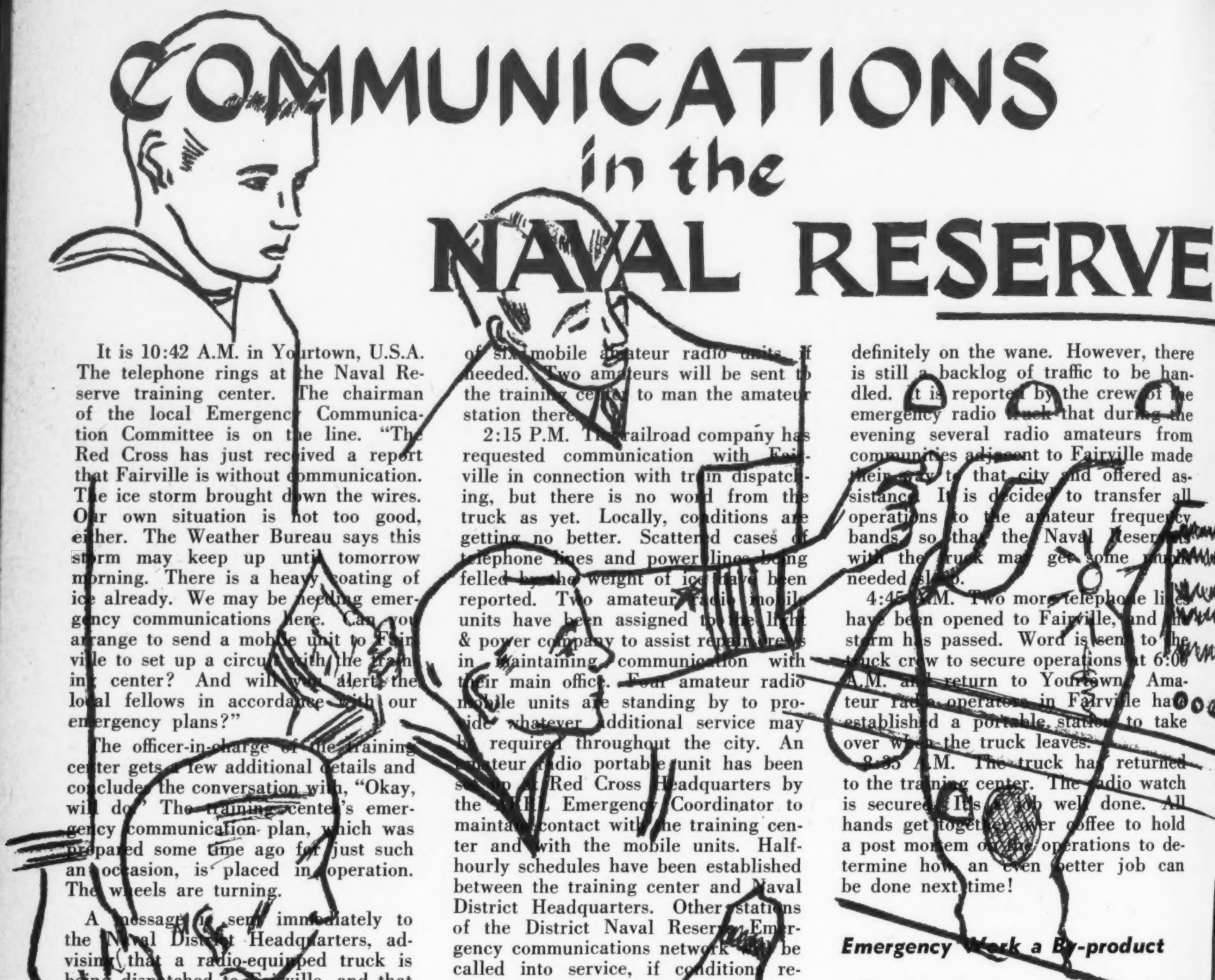
Remarkable things, these Jap balloons. They are made of white paper from rice stalk. The paper is one of the most remarkable inventions of the war. Unlike ordinary paper, this stuff gets tougher when wet. In fact, you can't tear it with your hands if you first dampen the piece. That's why they survived rain and clouds.

Just before I reached the C.O.'s Quonset hut I reached a clear spot where I could see what the searchlights had embraced. Just above a clump of cocoanut trees I could see where the three pencils of light converged on a large white spherical object that had all the appearance of some sort of

(*Continued on page 72, col. 2*)

"I don't even need my glasses on this problem!"

COMMUNICATIONS in the NAVAL RESERVE



It is 10:42 A.M. in Yourtown, U.S.A. The telephone rings at the Naval Reserve training center. The chairman of the local Emergency Communication Committee is on the line. "The Red Cross has just received a report that Fairville is without communication. The ice storm brought down the wires. Our own situation is not too good, either. The Weather Bureau says this storm may keep up until tomorrow morning. There is a heavy coating of ice already. We may be needing emergency communications here. Can you arrange to send a mobile unit to Fairville to set up a circuit with the training center? And will you alert the local fellows in accordance with our emergency plans?"

The officer-in-charge of the training center gets a few additional details and concludes the conversation with, "Okay, will do." The training center's emergency communication plan, which was prepared some time ago for just such an occasion, is placed in operation. The wheels are turning.

A message is sent immediately to the Naval District Headquarters, advising that a radio-equipped truck is being dispatched to Fairville, and that a standby emergency radio watch is being established at the training center. As this message goes out, portable radio equipment and emergency power supply are being installed in the truck. Three Naval Reservists, who had previously volunteered for such service when needed, have been contacted and are enroute to the training center to take the truck to the isolated city. One of these Reservists is a licensed amateur radio operator and will handle any operation that may be necessary on the amateur frequency bands.

It is now 12:45 P.M. The truck is on the road, estimate time of arrival at Fairville, 2:15 P.M. Meanwhile, the training center telephone has been working overtime, alerting those Reservists who are designated in the emergency communications plan to assist in times of disaster. Several have volunteered to come down to the training center at once to man the standby radio watch. The local emergency coordinator of the American Radio Relay League (ARRL) has been notified, and he is lining up local radio amateurs. He has volunteered the services of six mobile amateur radio units, if needed. Two amateurs will be sent to the training center to man the amateur station there.

2:15 P.M. The railroad company has requested communication with Fairville in connection with train dispatching, but there is no word from the truck as yet. Locally, conditions are getting no better. Scattered cases of telephone lines and power lines being felled by the weight of ice have been reported. Two amateur radio mobile units have been assigned to the light & power company to assist repair crews in maintaining communication with their main office. Four amateur radio mobile units are standing by to provide whatever additional service may be required throughout the city. An amateur radio portable unit has been set up at Red Cross Headquarters by the ARRL Emergency Coordinator to maintain contact with the training center and with the mobile units. Half-hourly schedules have been established between the training center and Naval District Headquarters. Other stations of the District Naval Reserve Emergency communications network will be called into service, if conditions require.

2:35 P.M. The training center has established radio contact with the emergency truck in Fairville. First message is to the Red Cross reporting the conditions, which are serious due to high winds as well as the ice storm. Heavy property damage is reported. Road conditions are particularly dangerous and a message is sent to the state police in this regard. The radio circuit now starts operation in earnest. Scores of messages are handled for the railroad, Red Cross, police, utilities, Weather Bureau, Western Union, and many others.

It is 10:50 P.M. before the situation eases. The telephone company has succeeded in opening one emergency line to Fairville. This takes over nearly all urgent messages, and it is now possible to handle messages for individuals requesting advice as to the welfare of relatives and friends. The schedule between the training center and Naval District Headquarters is secured. The storm has abated sufficiently to permit relaxing of local precautionary measures.

1:20 A.M. Fairville reports the storm definitely on the wane. However, there is still a backlog of traffic to be handled. It is reported by the crew of the emergency radio truck that during the evening several radio amateurs from communities adjacent to Fairville made their way to that city and offered assistance. It is decided to transfer all operations to the amateur frequency bands, so that the Naval Reservists with the truck may get some much needed sleep.

4:45 A.M. Two more telephone lines have been opened to Fairville, and the storm has passed. Word is sent to the truck crew to secure operations at 6:00 A.M. and return to Yourtown. Amateur radio operators in Fairville have established a portable station to take over when the truck leaves.

8:35 A.M. The truck has returned to the training center. The radio watch is secured. It's a job well done. All hands get together over coffee to hold a post mortem on the operations to determine how an even better job can be done next time!

Emergency Work a By-product

The foregoing is an imaginary case of emergency. It is, nevertheless, a reliable example of one kind of public service performed by the Naval Reserve. There are on the record innumerable actual cases where members and activities of the Naval Reserve have provided emergency communications to their communities in time of disasters when normal communications facilities were disrupted.

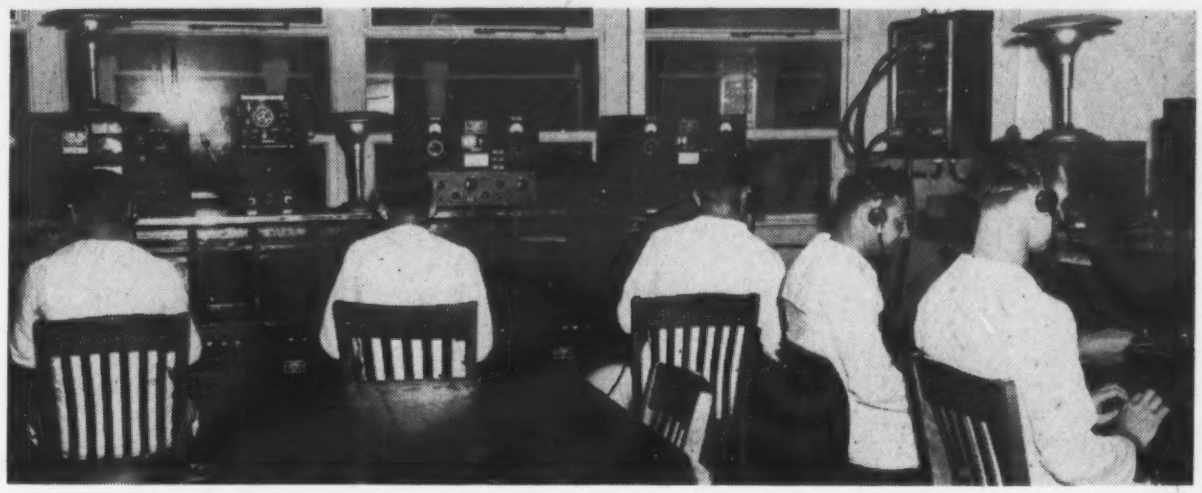
Emergency operation by Naval Reserve radio stations is conducted within the framework of the Naval Reserve communication networks. Emergency operation is a by-product of the system. rather than the reason for its existence. The Naval Reserve communication networks exist primarily to provide, for members of the Naval Reserve, practical "on-the-air" training in military communications. The fact that portable radio units and emergency power supplies are part of the training equipment furnished to Reserve radio stations does, of course, make these stations a potential for emergency communications. In the interest of preparedness, activities which operate Naval Reserve stations have developed

emergency communication plans. When disaster strikes, the success of these plans depends on the voluntary service of individual reservists associated with Naval Reserve radio stations in a training status. The good work of such reservists in times of need is a tribute to their initiative and ability. In some measure, it also reflects the effectiveness of the communication training program of the Naval Reserve.

Communication training in the Naval Reserve is in two parts. First is the classroom and laboratory phase. Reservists studying communications receive instruction in the basic skills of their field: radiotelegraph code, typewriting, military operating procedure, fundamental radio theory, and use of equipment. Installed in Reserve training facilities is a wide variety of receivers, transmitters, and other tools of the communicator.

When his ability to copy code, to apply military procedure, and to use radio equipment has progressed sufficiently, the student starts the second phase of the training program—"on-the-air" practice. This phase emphasizes the concept that the best way to learn is by doing. It is accomplished through the Naval Reserve communication networks.

There is a Naval Reserve radio station at each Naval Reserve training center. Radio stations are also maintained by Naval Reserve electronics companies and electronics platoons. These units normally are not located in the vicinity of a training center and, consequently, have their own quarters. The Naval Reserve communication networks are made up of some 800 radio stations, located in as many communities throughout the United States and in Hawaii, Alaska, and the Canal Zone. In addition to the organizations already mentioned, units of the Naval Air Reserve, Marine Corps Reserve, and Coast Guard Reserve are authorized to participate.

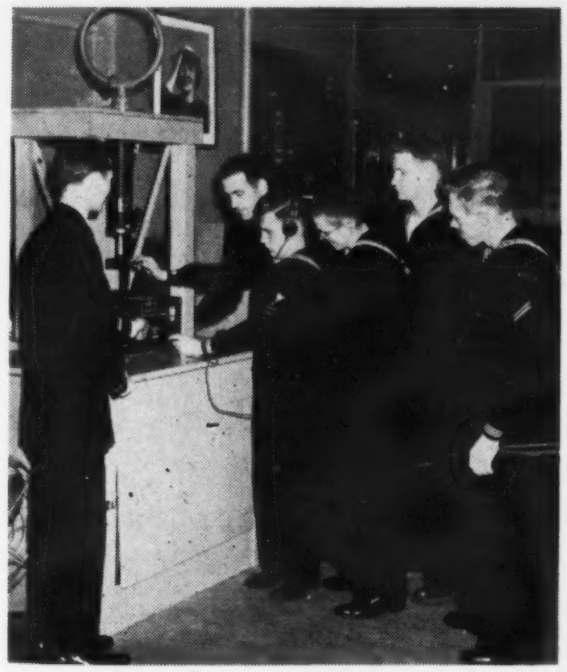


Radio operating room, Naval Reserve training center, Port Arthur, Texas.

Each Naval Reserve radio station is assigned to a training circuit for drill purposes. These circuits are numerous, since so many stations are involved and since assignment to a circuit must correspond with the evening on which each unit holds its meeting. Many stations are used by more than one unit and are, therefore, assigned to more than one training circuit.

The training afforded by the radio circuits covers all aspects of radio operating in the Navy. Although actual operation is, of course, limited to one student at a time, it is customary to assign several to receiving positions for practice in radio code reception and log-keeping. Qualified students are rotated at the operating position so that all may benefit from the practical experience in two-way communication.

A control station is asigned for each circuit to insure orderly operation. Although circuit stations are manned by inexperienced personnel, emphasis is placed on the observance of proper circuit discipline and the use of correct operating procedure in order to further realistic training. At the conclusion of radio drills, circuit logs are studied, and errors in operation are brought to the attention of the operators concerned. This is a particularly important part of the training process.



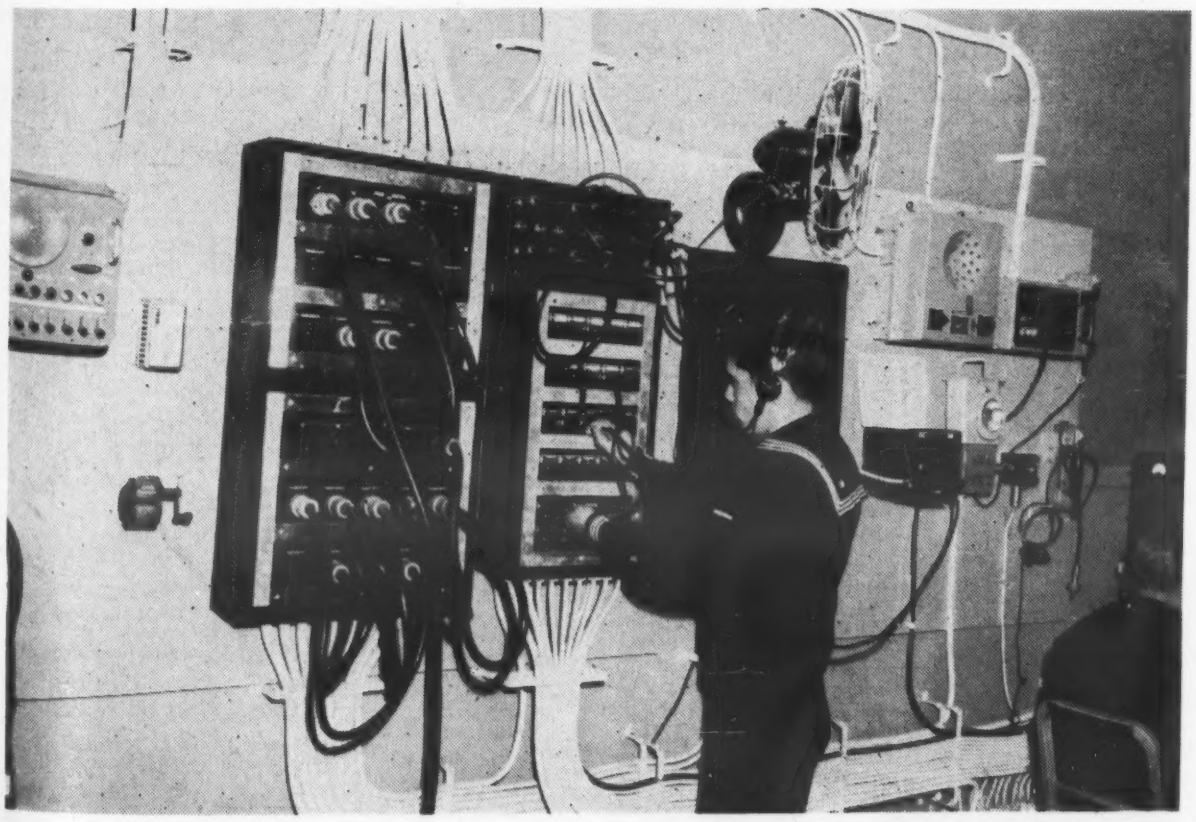
Instruction in use of a radio direction finder at Naval Reserve electronic Company 9-170, Valparaiso, Indiana.

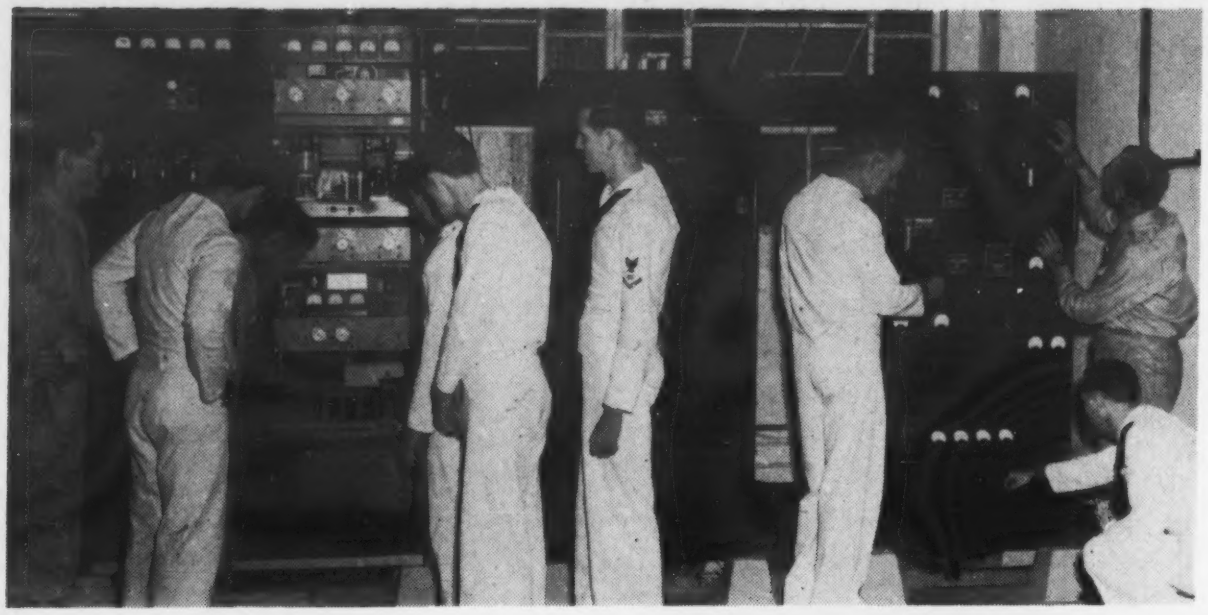
In addition to becoming proficient in operating, the reservist in training as a radio operator must attain several skills in connection with radio equipment. Therefore, instruction is given in transmitter tuning, shifting antennas, receiver adjustment, use of frequency meters, and the use and operational upkeep of all items of equipment in the radio shack. To further this instruction, radio circuit drills include special exercises, such as changing frequencies, and shifting to emergency power supplies.

Selected Naval Reserve radio stations are equipped with radioteletype (RATT). Special drills for these stations provide training in the use of RATT equipment. All training centers are authorized two teletype instruments. These are set up in wired circuits within the center for practical two-way training in teletype techniques and procedures. These units also may be adapted for radio use.

The importance of molding training schedules to the needs of the individual is recognized in the Naval Reserve

Transmitter, receiver and antenna patch panels, Naval Reserve Training Center, Albuquerque, New Mexico.

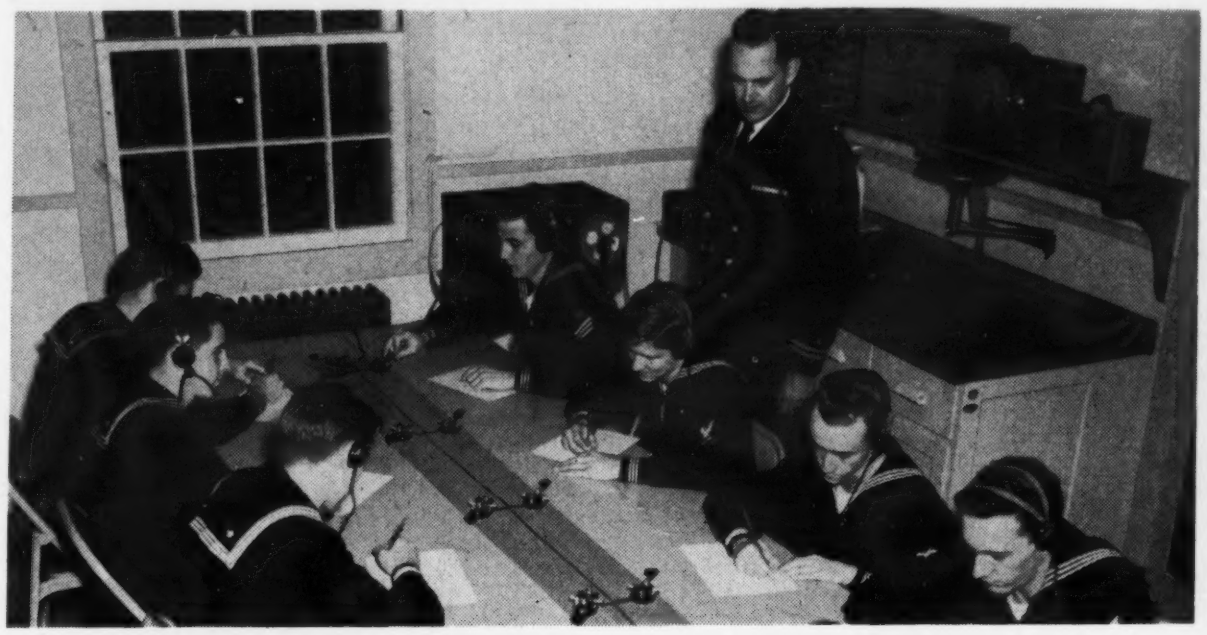




Transmitter familiarization and tuning instruction at Naval Reserve Electronics Company 15-1, Balboa, Canal Zone. This unit operates amateur station KZ5NC.

communication program. When group instruction is desirable or necessary, the size of the groups is kept as small as possible. With the equipment and facilities available to Reserve units, it usually is possible to assign to each individual a training schedule to fit his particular needs. For example, if he is strong on operating, but weak in use of equipment, his time can be spent at the transmitters and other equipment. If he is well qualified in all ways except radio code reception, he can spend his time at the code practice tables. He may use the code practice machine, which sends code automatically, or material taken directly off the air can be piped from a radio receiver to his headphones. Specific needs of other individuals may be handled similarly by assignment of a specially tailored training schedule.

As a further means of fitting the training to the individual, special provision is made for reservists who hold amateur radio licenses. Any member of the Naval Reserve, Marine Corps Reserve, or Coast Guard Reserve, who is a licensed radio amateur may be authorized to take part in Naval Reserve radio drills from his home radio station. In such cases, the station is designated "Individual Naval Reserve Radio Station." Individuals so authorized may be assigned to training circuits and thereby get practice in military procedures, over and above that gained as members of Reserve units. More than 1000 radio amateurs have such authorization.



Instruction class in radio operating procedure, Naval Reserve electronics company 5-3 College of William and Mary, Norfolk, Va.

Television experiments are one of the activities at amateur station K5NRG, Naval and Marine Corps Reserve Training center, Corpus Christi, Texas. Equipment pictured was constructed by members of organized surface division 8-73.

Interest in amateur radio is encouraged in the Naval Reserve. Amateur radio stations are operated at some 500 Naval Reserve training activities. Apart from its merit as a worthwhile recreational and hobby activity, amateur radio fosters a natural and lasting interest in communications and electronics. Reservists with leanings toward those fields are urged to qualify for amateur licenses. Many activities conduct special classes to help applicants prepare for license examinations.

Inasmuch as this article is concerned with operational communications in the Naval Reserve, discussion has been centered around the radio stations and the training of radiomen (radio operators). It should be pointed out, however, that the Reserve units mentioned also train personnel in many other specialties associated with communications. There are, for example, the following additional ratings in training: quartermasters (signalmen), radarmen, sonarmen, and electronics technicians, all of whom belong to the combined "communications-electronics team."

The Naval Reserve communications program offers a two-fold opportunity to the individual. First, the patriotic opportunity to prepare himself to serve his country. Second, the personal opportunity to enter a challenging field of endeavor. Although the first goal is never subjugated by the second, an objective approach recognizes that reservists are first civilians. They have the many responsibilities and diversions of a civilian existence. Therefore, the communication program, like all other Naval Reserve programs, is made as interesting and profitable as possible. Opportunities to learn and to participate are not limited to the "one drill night per week." Correspondence courses are available for home study. The facilities of training activities are open for use in such after-hours activity as the trainee wishes to participate. For an interested individual, there is no limitation other than his capacity to learn.

this is

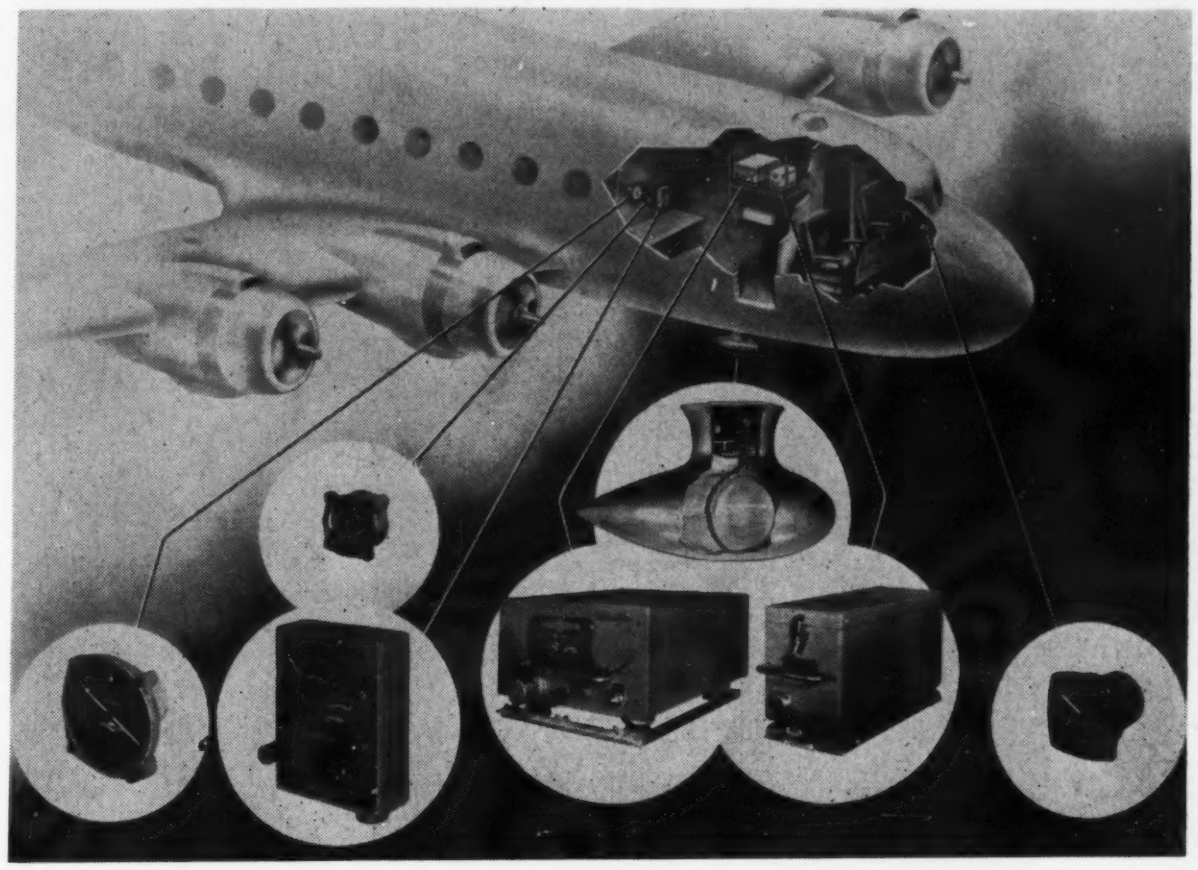
BENDIX RADIO

By Leo G. Sands

Possibly the most widely used airborne electronic instrument, the Bendix Radio Compass is standard equipment on most of the world's airlines and American military planes. The radio compass is but one of the many types of aviation radio equipment manufactured by Bendix Radio. It has been said that 100% of America's airlines use Bendix Radio equipment.

The Civil Aeronautics authority has awarded a contract to Bendix Radio for airport radar landing systems to be installed at 34 of the nation's major airports. Of these, 19 will be airport surport surveillance radar systems and 15 will be precision approach radar systems. Bendix was the first and is one of the largest manufacturers of ground controlled approach (GCA) radar equipment.

Today more than 44 of the nation's railroads are using train radio communications equipment manufactured by Bendix. Radio is helping the railroads move freight faster through yards and terminals and on the mainline. The railroads were not quick to adopt radio because it was not as simple a matter as it was for the taxicab industry, public safety organizations and other users of mobile radio. Many obstacles presented by installation and operating conditions are being overcome, and the railroads are now adopting radio at an ever increasing rate.



Major components of Bendix NA-1 navigation system.

Many Sub-contracts

Radar, communications and navigation equipment is being built today by Bendix Radio for the armed forces as fast as human ingenuity and the availability of materials, machinery and manpower will permit. The accelerated demand for military electronic equipment created by the tense international situation has made it necessary for Bendix Radio to expand its forces and to acquire additional production facilities. To speed up deliveries and to aid smaller manufacturers many parts and assemblies normally built by Bendix are now being made for Bendix by sub-contractors.

During World War II, the Bendix Radio nameplate was familiar to millions of GI's. Almost every allied plane depended on some piece of equipment manufactured by Bendix Radio. Known to almost every pilot was the SCR-522 V.H.F. transmitter-receiver combination of which tens of thousands were built by Bendix. From an English design, Bendix engineers redesigned the predecessor of the SCR-522 to fit American production methods and in but a few months the American versions were in active war service. Almost half a billion dollars worth of precision radio and radar equipment was delivered to the Army, Navy, Air Force and Allies before the war ended.

All of the GCA equipment delivered to the Navy during the war was built by Bendix. Eighty-one mobile ground controlled approach radar systems were delivered to the Navy during the war years. The original tower operated GCA system was installed at Banana River, Florida. A tower operated GCA system of more modern design built by Bendix was later installed by the Navy at Quonset Point Air Base to provide all-weather landing facilities. In Little America, a Bendix Airport Surveillance Radar was used by the Navy on its "operations highjump." This first use of radar in the Antarctic made it possible to guide planes under very adverse weather conditions onto an improvised landing area on the 200 feet thick Ross Ice Shelf. Navy fliers have said that the "seeing eye" was a great comfort in flying over the white death-like Antarctic wastes.

Before the war, very little use was made of the very high frequency portion of the radio spectrum. With the experience gained during the war Bendix engineers felt that VHF radio might hold promise for a practical system of train communication. Heretofore, attempts to adapt radio to railroad operations had failed because of the limitations of the lower frequencies which required more bulky antennas and higher power. Using the war-time SCR-522, Bendix engineers conducted tests with a number of railroads to determine the feasibility of using VHF radio on railroad rolling stock. Thousands of miles in all parts of the country were traversed in the course of these tests.

Satisfied that VHF would do the job, Bendix engineers developed a radio transmitter-receiver unit that would stand up in railroad service where extremes in shock, vibration, temperature changes and input voltage fluctuation are encountered. The first commercial

railroad radio equipment employed amplitude modulation with a fast acting automatic volume control circuit which removed flutter. Although AM gave a fine account of itself, the popular demand for frequency modulated equipment made it necessary for Bendix to switch to FM which was used in all succeeding models. Since then FM has been universally adopted for railroad and other land transportation radio services.

The first railroad to be granted a permit to operate experimentally in the 152 to 162 megacycle band was the Chicago, Rock Island and Pacific Railroad. The Denver and Rio Grande Western Railroad was granted the first permanent railroad radio license. Among the railroads that helped pioneer railroad radio were the Baltimore & Ohio, Burlington, Northern Pacific, Santa Fe, Milwaukee, Bessemer and Lake Erie, the Seaboard Air Line and the Central of Georgia.

Radio is used by the railroads to communicate with the crews of switching locomotives in classification yards and terminals, for providing communications facilities between the caboose and engine on long freight trains and to permit train crews to contact wayside operators. One of the first railroads to equip its entire main line with radio was the Chicago, South Shore and South Bend, an electrified line that operates between South Bend and Chicago. Designed by Bendix engineers, the South Shore radio system was the first to be licensed to make use of the VHF mobile relay technique which abolished the need for land lines for interconnection of the three wayside radio stations.

Fireman of a diesel-electric railroad locomotive talking via Bendix VHF radio to the conductor in the caboose.

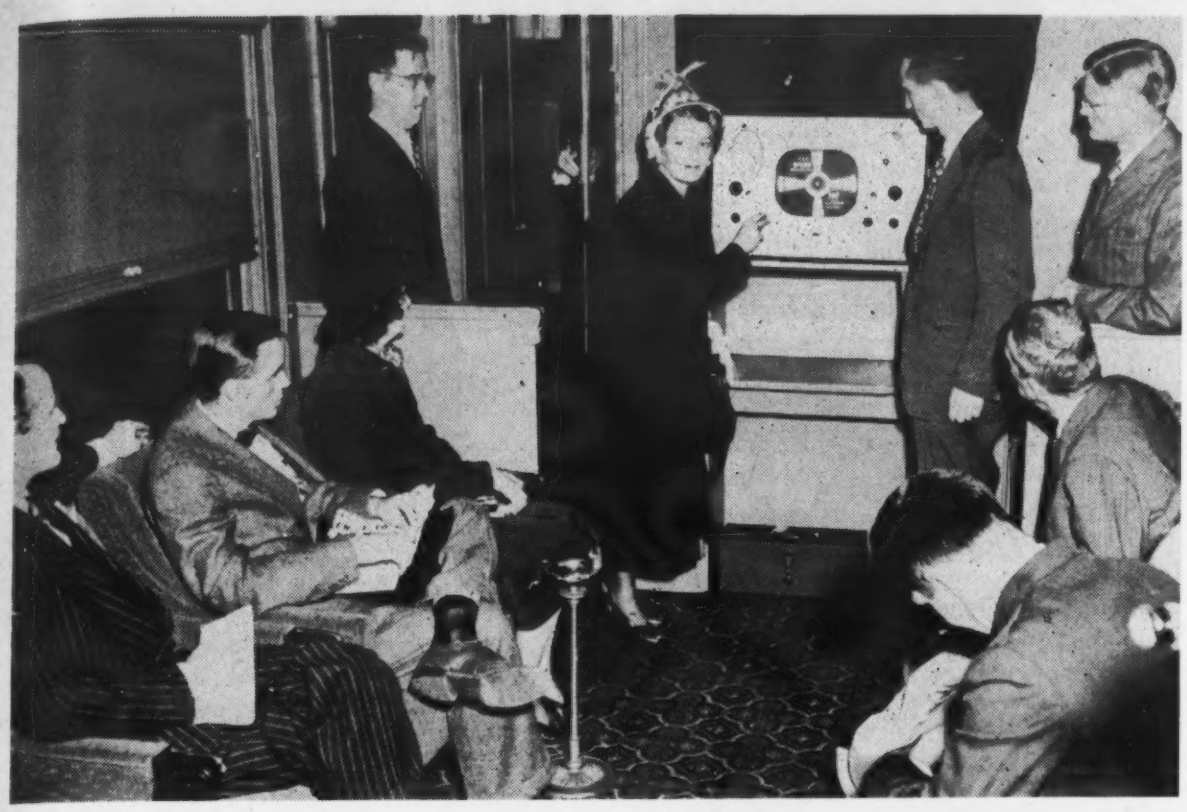
Howard Sagers, E. K. Foster, general manager, Carl Barley and Tim Behegan check a production drawing.

Bendix Radio was organized to produce precision radio and electronic apparatus. The experience and "know-how" behind this great name dates back much further than the time the company was first organized under the Bendix banner. The corporate predecessor of the present company, Bendix Radio Corporation, was formed through the consolidation of a number of manufacturing and engineering organizations which brought to the new company a nucleus of outstanding engineering skill and production talent plus greater financial strength and stability.

The new company originally maintained its research laboratories in Washington, D. C., and its manufacturing and administrative headquarters in Chicago. In 1937 the research laboratories were moved to Baltimore to the well known Fort Avenue plant. The following year the Chicago plant was closed and the headquarters of all departments were concentrated in Baltimore. This city was chosen because of the availability of skilled artisans, excellent transportation facilities and close proximity to both New York and Washington.

A new plant was built near Towson, Maryland, a suburb eight miles north of Baltimore in a picturesque setting in the rolling hills of Baltimore County. This new plant now known as plant No. 1, was built in 1941 and has a floor space area of about 500,000 square feet. It is served by a spur from the Maryland and Pennsylvania Railroad, fondly referred to as the "Ma and Pa," as well as by fine highways. One of the

Automotive radio assembly line at Bendix Radio, Towson plant, which produces 2500 sets per day.



Commissioner Frieda Hennock of the FCC tunes in television program while aboard B&O "Marylander." Tests to determine practicability of providing television receivers on moving trains for entertainment of passengers were conducted jointly by B&O and Bendix Radio.

most beautiful in America, this plant is provided with the most modern facilities for research, development and production. Additional production facilities are located at Dundalk, Maryland and at Harbor Field in Baltimore.

In 1943, Bendix Radio Corporation became the Bendix Radio Division of Bendix Aviation Corporation. Recently the division has been divided into two groups, the Bendix Radio Communications Division and the Bendix Television and Broadcast Receiver Division, the latter handling the sale and merchandising of home radio and television receivers. Bendix Radio is one of the 18 divisions of Bendix Aviation Corporation.

One of the world's longest and the most modern automobile radio assembly lines located in the Bendix plant at Towson turns out approximately 2,500 automobile radios per day for the Ford Motor Company. Once a blank chassis is placed on the assembly line it remains on the conveyor belt until nents are installed and wired in 227,500 operations each day.

One of the groups of designers and draftsmen at the Bendix Radio plant in Towson.

To meet the need for greater range and for more reliable air-to-ground also producing the Omni-Directional Range Gonimeter for the CAA for use on the ground in connection with the nation-wide Omni-Directional Range System which will establish an infinite number of airways in all parts of the country.

At the present time, Bendix Radio is of course developing and producing a great deal of military electronic equipment. Because of security regulations it is not possible to discuss here any details about the equipment or application of the equipment now being built by Bendix for the armed forces. For the consumer, Bendix Radio is manufacturing as many television receivers as parts availability will permit. The demand for television sets is higher than the ability of component manu-

(*Continued on page 74, col. 2*)

Left: A. E. Abel, chief radar engineer, and W. L. Webb, director of engineering and research, checking calibration of a crystal frequency indicator.

communications, Bendix engineers have loaded for shipment. 66,750 compodeveloped the new high power TA-18 airborne VHF transmitter with a conservative power output rating of 25 watts which can transmit on any of 180 VHF communications frequencies. Through the use of the unique Bendix "crystal saver" circuit, only 28 crystals are required for transmission on any of the 180 channels which are selected by rotating two knobs calibrated directly in megacycles.

Bendix Radio is now producing large quantities of omni-directional range navigational equipment which operates in the VHF portion of the radio spectrum providing freedom from static and noise. A feature of the Bendix omnidirectional range equipment is the omni-mag indicator which provides "picture-window" flying. This new indicator which has been flight tested by the executives of many air lines, provides in one instrument enough information needed by the pilot to fly accurately to his destination. Bendix is

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Ellery W. Stone

**Executive Committee Member*
†Executive Committee Member, non-voting

Photo Contest Awards

The ROTC photography contest sponsored jointly by the Armed Forces Communications Association and the Signal Corps closed April 30. Judging of the photographic entries took place May 3rd at the Pentagon.

Prizes awarded the winners in the contest were donated by Armed Forces Communications Association industrial group members Eastman Kodak Company, Graflex Inc., The Haloid Company, and the Ansco division of the General Aniline & Film Corporation.

Prize winning photos in the contest will be published in the next issue of SIGNAL with available background on the photogapher.

This issue merely lists the winners and prizes. They are as follows:

FIRST PRIZE

Medalist Camera **(Eastman Kodak Co.)**

Lester Pfeffer
New York University

SECOND PRIZE

Century Graphic Camera **(Graflex Inc.)**

Young Eng
Rutgers University

GENERAL PRIZE WINNERS

Daylight Color Film, 120 **(General Aniline & Film Corp., Ansco Division)** ***11 x 14 Portrait Paper*** **(Haloid Company)**

Roger Berry
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Louis E. Adams
Texas Technological College

John H. Bergstrom
University of Michigan

Arthur Bergerud
Oregon State College

Richard M. Clohecy
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Harold Ward Clarkson College
Clarkson College

Robert S. Maudlin, Jr.
University of Alabama

Otto J. Thomas
Oklahoma A & M College

Dresslar M. Pruett
University of Oklahoma

Sherlock A. Johnson
Iowa State College

SACRAMENTO—Chapter of the Year

To the tune of "California, Here I Come," played at the request of the delegation from the Augusta-Camp Gordon Chapter, last year's winner, the Sacramento Chapter was officially installed as AFCA's 1951 Chapter of the Year during the annual banquet in Chicago on April 20th. Major C. A. House, Sacramento Chapter Secretary, to whom much of the credit goes for the chapter's outstanding record, was on hand to receive the award for first place from Col. George Dixon, AFCA executive secretary. The chapter won the title with 26.7 points.

The Pittsburgh Chapter, which staged a highly successful membership campaign in the last months of the contest came out a close second with 23.9 points and the certificate for second place was presented to Chapter President Fred Moran.

Third place was won by the Seattle Chapter with 19.4 points, fourth place went to San Francisco with 18.9 points, and fifth place to Boston with 17.4 points. Augusta-Camp Gordon, New York and Philadelphia won honorable mention for a tie in sixth place with 17.1 points each.

The 1951 contest was closer than ever before, reflecting the increased interest and activity of the various chapters. Membership drives were conducted by most chapters and more interesting meetings were held throughout the country than in previous years.

The contest runs from April 1st through March 31st, the fiscal year of the association, and is judged on the following basis: the number of members in each chapter as of April 1st is used as a basis for determining the percentage of new and renewed memberships in the chapter during the year. Points are arrived at by multiplying the percentage of new members by 5 and the percentage of renewals by 10, and by awarding 1 point for each chapter meeting. For example: Sacramento brought in 209% in new members—multiplied by 5, this gave them 10.5 points; they renewed 92% of their members—multiplied by 10, this amounted to 9.2 points; they held 7 meetings, which at the rate of 1 point per meeting, gave them 7 additional points, and a total of 26.7 points earned in the contest.

No suggestions were made at the annual chapter presidents' meeting for changes in these rules and it was decided that they remain in force for the 1951-52 contest.

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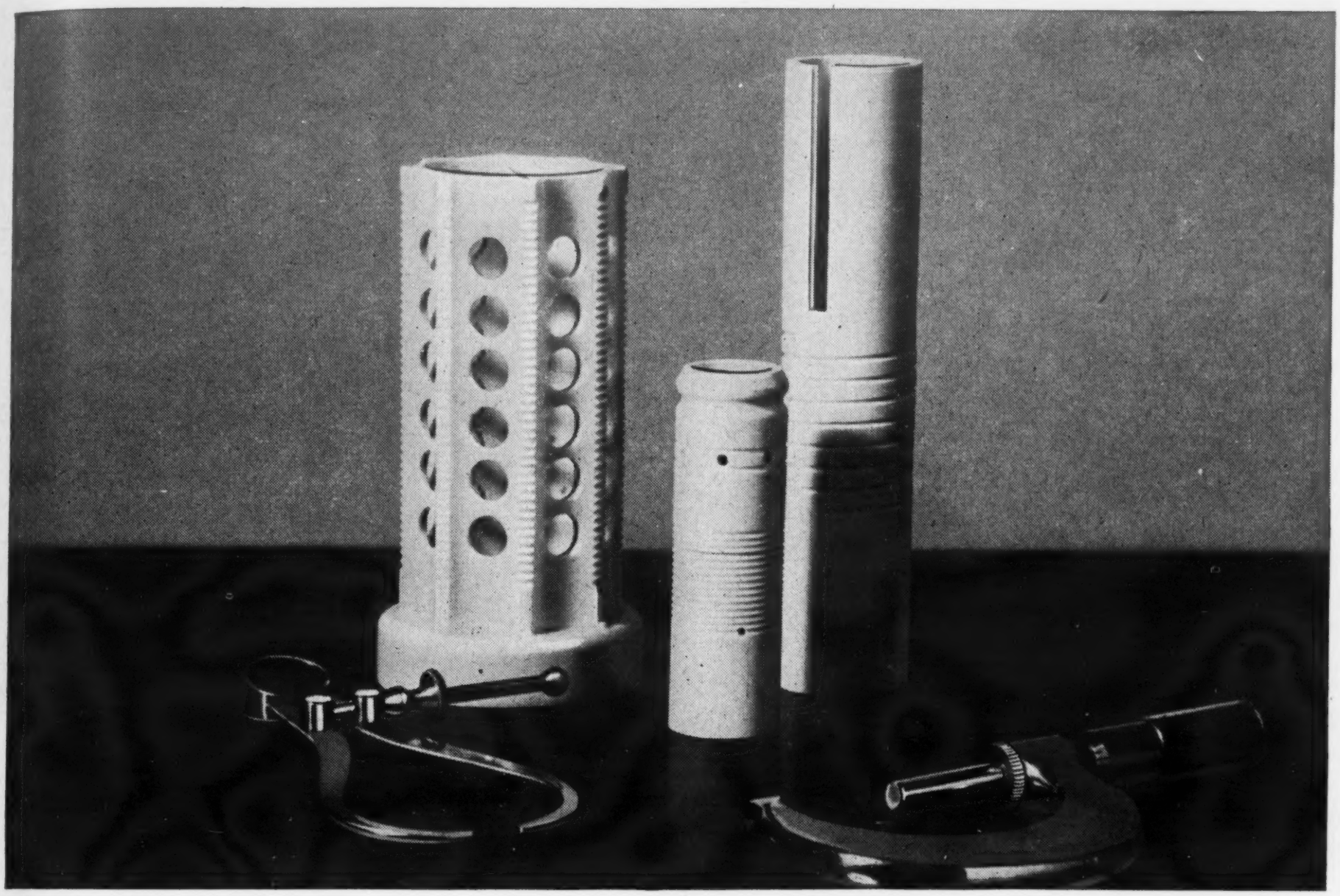

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Purdue University

Charles Clinkenbeard
Iowa State College

Ward H. Gunsolley
Iowa State College

Raymond J. Ransil
Carnegie Institute of Technology

Larson Russell Kese
Oklahoma A & M College

William T. Von Behren
Purdue University

James A. King
University of Arkansas

Dale M. Bassett
Oregon State College

Adm. Stone Ordered To Sea Duty

Rear Admiral Earl E. Stone, USN, elected 1st vice president of the AFCA at its recent Chicago Convention, and who has been serving since August 1949 as director of the Armed Forces Security Agency of the Joint Chiefs of Staff, has been ordered to sea duty in a command capacity with the fleet in the Pacific. He is slated to take over his sea duty assignment on the west coast around the middle of July.

Prior to heading the Armed Forces Security Agency, Admiral Stone was Chief of Naval Communications from January 1946 to July 1949, and during this postwar period he directed in a constructive way the reorientation of Naval communications on a peacetime basis from its expanded World War II status.

As a farewell affair, Admiral Stone and Mrs. Stone were entertained June 14 at a dinner by Rear Admiral Stanford C. Hooper, USN (ret.), who is revarded as the "Father of Navy Radio," and Mrs. Hooper.

New Directors Named at Chicago

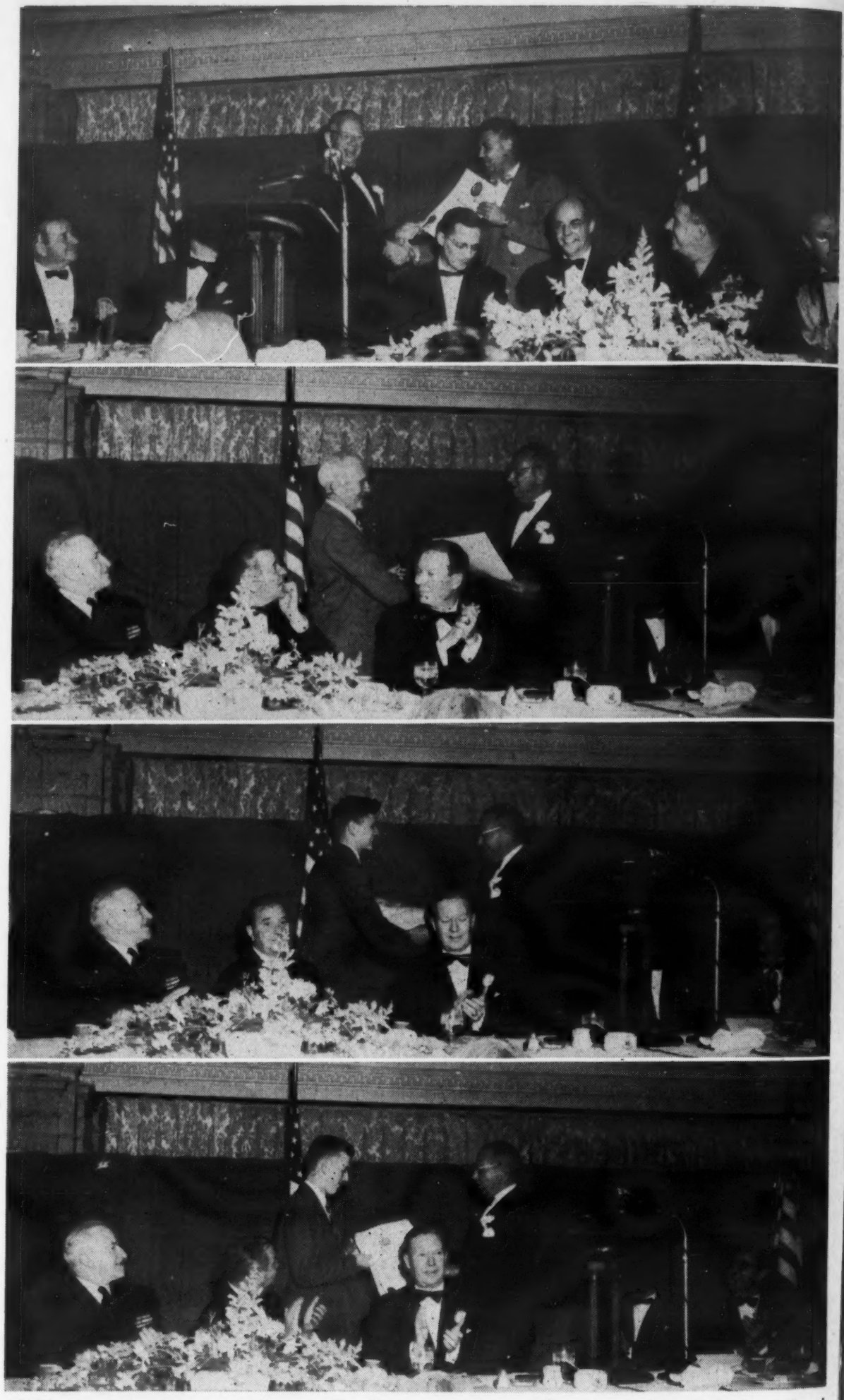
Among the officers and directors chosen at the AFCA's 1951 Convention in Chicago, there will be noted several new names as listed in the left hand box on page 40. While new in this list, these directors are of course familiar in association affairs, having been, most of them, active in the AFCA since its beginning. These are:

Thomas F. Halloran, Major Gen. Kirke B. Lawton, Vernon Bagnall, Roland Davies, G. C. Whitaker, Maj. Gen. Francis M. Lanahan, William V. Kehler, Harry E. Austin, Percy Black, and Oliver Read. (*See story, page 16, for details.*)

Maddocks Retiring, In Business

Retiring from the Army in June, Colonel Thomas H. Maddocks, Signal Corps, has set up his own company in his home town, Charlottsville, Virginia, to retail and service television receiving sets.

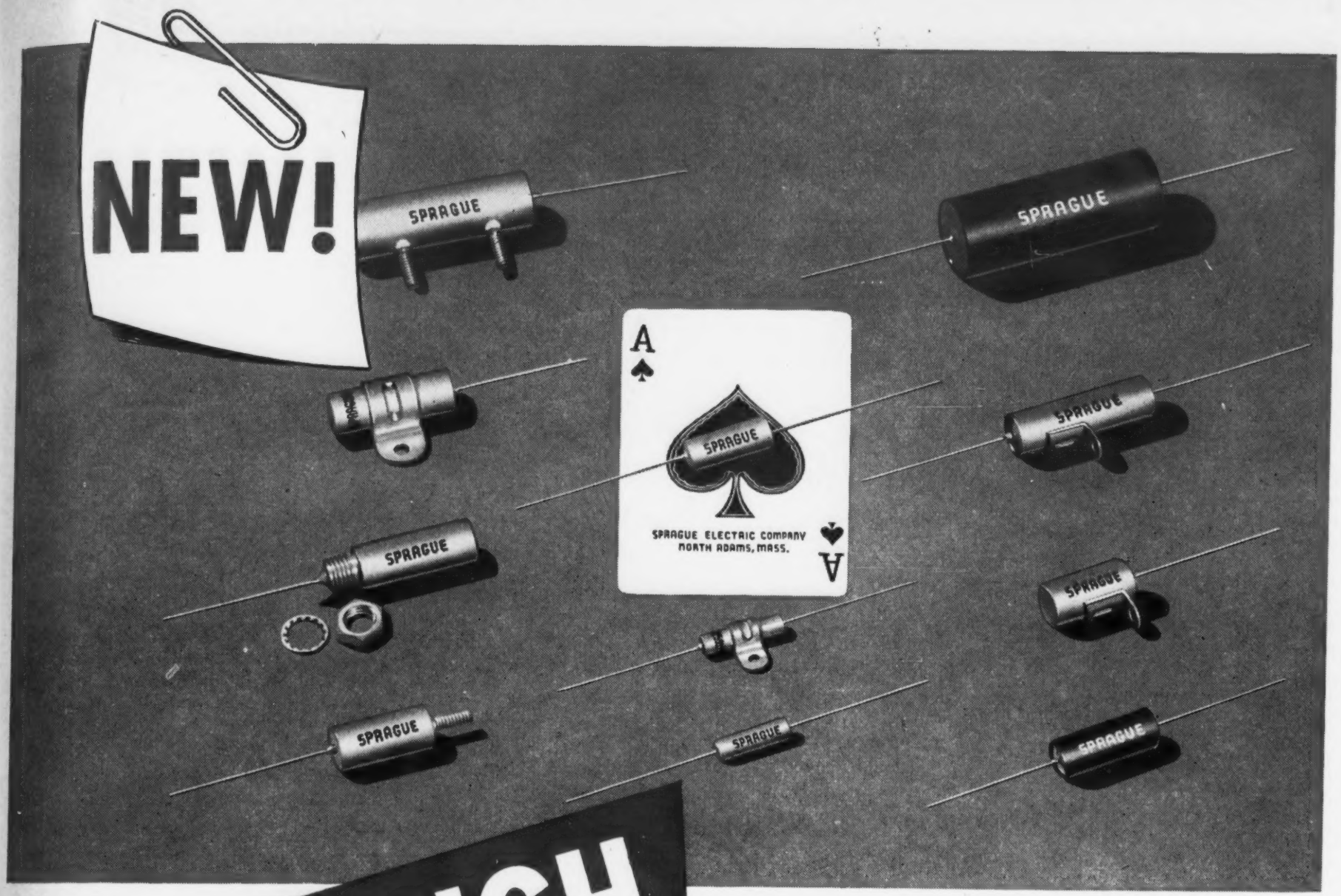
A Life Member of the AFCA, Colonel Maddocks had been recently a permanent member of the Signal Corps Board, Fort Monmouth, N. J., and was formerly signal officer of the Third Army.



AFCA Executive Secretary George P. Dixon presents certificates at Association's national annual meeting for 1951, at Chicago. Top: Chapter Of The Year certificate is presented by Col. Dixon (left) to winning Sacramento Chapter's Secretary C. A. House. Second from top: Certificate for the runner-up in the Chapter Of The Year contest is awarded to Pittsburgh Chapter's President Fred E. Morgan. Third down: University of Illinois Student Chapter Secretary Milton F. Langer receives AFCA charter for his recently organized chapter. Bottom: President Norman C. Saunders of Purdue University Student Chapter is presented AFCA charter for his new chapter.

ROTC Awards

This year, as a result of the increased interest in the Association's annual awards, three medals, instead of one as in the past, are being awarded at each college or university requesting them. The awards are made to outstanding ROTC students taking military train-



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. . . for miniaturization, mounting, and temperature problems

Here they come, right off the top of the deck, to fill in what's been needed—new ways of mounting subminiature capacitors in military electronic equipment!

You'll find side stud, end stud, threaded neck, and two types of side bracket capacitors in Sprague's new 16 page Engineering Bulletin 213-B.

These new Sprague-pioneered designs make even broader the world's most complete line of solder-seal terminal metal-encased subminiature paper capacitors.

And they're now available as standard in a 125°C. temperature rating Vitamin Q® capacitor series. Voltage ratings range from 100 to 1000 volts in both inserted tab and extended foil constructions.

And remember, Sprague Capacitors are the standard of dependability for critical electronic circuits. Write for your copy of Bulletin 213-B which gives the complete Sprague Subminiature Story.

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NORTH ADAMS, MASSACHUSETTS

PIONEERS IN ELECTRIC AND ELECTRONIC DEVELOPMENT

AFCA GROUP MEMBERS

Communications—Electronics—Photography

Listed below are the names of the American firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation in our special fields.

Acme Telectronix
American Cable & Radio Corp.
American Institute of Electrical Engineers
American Phenolic Corporation
American Radio Institute, Inc.
American Radio Relay League
American Steel & Wire Company
American Telephone & Telegraph Co.
Anaconda Wire & Cable Company
Argus Cameras, Inc.
Arnold Engineering Company
Astatic Corporation
Automatic Electric Company
Automatic Electric Sales Corp.

Baltimore News Post
Barry Corporation, The
Bell Telephone Company of Pa.
Bendix Radio
Bliley Electric Company
Breeze Corporation, Inc.
Burnell & Company

California Water & Telephone Co.
Capitol Radio Engineering Inst., Inc.
Carolina Telephone & Telegraph Co.
Central Radio and Television Schools
Chesapeake & Potomac Tel. Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Columbus Process Co., Inc.
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electric School, Inc.

Da-Lite Screen Co., Inc.
Diamond State Telephone Co.
DuMont, Allen B, Laboratories, Inc.

Eastman Kodak Company
Eby, Inc., Hugh H.
Electronic Associates, Inc.
Espey Manufacturing Co., Inc.

Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.

General Aniline & Film Corp.
General Cable Corporation
General Electric Company
General Insulated Wire Works, Inc.
General Instrument Corp.
General Telephone Corp.
Gilfillan Bros., Inc.
Graflex, Inc.
Gray Manufacturing Co.

Hallicrafters Company
Haloid Company
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motors Corp.
Hoffman Radio Corp.

Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Resistance Co.
International Tel. & Tel. Corp.

Jacobsen Manufacturing Co.

Kellogg Switchboard & Supply Co.
Kleinschmidt Laboratories, Inc.

Lavoie Laboratories
Leich Sales Corporation
Lenkurt Electric Company, Inc.
Lewyt Corporation
Loral Electronics Corporation

Machlett Laboratories, Inc.
Magnavox Company
Mallory & Co., Inc., P.R.
Martin, Glenn L., Company
Merit Transformer Corp.
Michigan Bell Telephone Company
Motorola, Inc.
Mountain States Tel. & Tel. Co.

National Company, Inc.
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
Northwestern Bell Telephone Co.

Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Operadio Manufacturing Company

Pacific Telephone & Telegraph Co.
Philco Corporation
Photographic Society of America
Precision Apparatus Co., Inc.

Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Ray-O-Vac Company
Raytheon Manufacturing Company
Reeves Instrument Corp.
Remington Rand, Inc.

Saxonburg Potteries
Sherron Electronics Co.
Simmon Brothers, Inc.
Smuckler & Company, Inc., A. F.
Society of Motion Picture Engineers
Sonotone Corporation
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sperry Gyroscope Company
Stackpole Carbon Company
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.

Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Times Facsimile Corporation
Transmitter Equipment Mfg. Co.
Tung-Sol Lamp Works, Inc.

United Radio Television Institute
United States Rubber Company
United Telephone Co.

Webster-Chicago Corporation
West Coast Telephone Co.
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company

ASSOCIATION AFFAIRS

ing with communications and electronics as the major course.

A gold medal is awarded to the outstanding senior student in each college, a silver medal for the outstanding junior, and a bronze medal for the outstanding sophomore, regardless of whether the student is Signal Corps, Navy or Air Force. If more than one service has a communications unit at the college, a board appointed by the college authorities determines the winners since only one set of medals is being awarded at each college.

The following colleges and universities are participating in the AFCA award program for the scholastic year 1950-51. The names and photographs of the winning cadets will be published in the July-August issue of SIGNAL.

A&M College of Texas
Alabama Polytechnic Institute
Carnegie Institute of Technology
Clarkson College of Technology
Clemson Agricultural College
Cornell University
Georgia Institute of Technology
Iowa State College
Kansas State College
Lehigh University
Massachusetts Institute of Technology
Michigan State College
Montana State College
New York University
North Carolina State College of A&E
Norwich University
Ohio State University
Oklahoma A&M College
Oregon State College
Pennsylvania State College
Purdue University
Rensselaer Polytechnic Institute
Rutgers University
Southern Methodist University
Syracuse University
Tennessee Polytechnic Institute
Texas Technological College
Union College
University of Alabama
University of Arkansas
University of California
University of Detroit
University of Florida
University of Idaho
University of Illinois
University of Kentucky
University of Louisville
University of Maine
University of Michigan
University of Minnesota
University of Nebraska
University of New Mexico
University of Pennsylvania
University of Tennessee
University of Washington
University of Wisconsin
Utah State Agricultural College
Virginia Polytechnic Institute
Washington State College
West Virginia University

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The Jensen G-610 Loudspeaker System brings you clear, clean, life-like reproduction with thrilling transport-to-the-original such as you have never heard before. Of course G-610's are in short supply, for the government has restricted cobalt for Alnico V magnets—and the G-610 has more magnetic energy than any speaker ever built. But when restrictions are relaxed and G-610's are again plentiful, then be *sure you get* a G-610 . . . NO ONE has ever heard one who didn't want one!

Illustrated with Blonde model M-253 cabinet showing accessory legs.

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BURTON BROWNE ADVERTISING

CHAPTER NEWS

Augusta-Camp Gordon

Methods of increasing membership were discussed at the chapter's February 27th meeting with the conclusion that additional interest could be stimulated by increased advertising and publicity, interesting programs and membership drives. It was also decided that the communications personnel at the "H" plant project in the area be extended an invitation to join the chapter.

Francis A. Saxon of the Georgia Power Company detailed the communications aspects of the Augusta civil defense organization and asked that the chapter contact headquarters Camp Gordon concerning the appointment of a liaison officer from Camp Gordon to work with the communications section of the local civil defense unit. Chapter President Norman Kinley was authorized to contact headquarters Camp Gordon on this.

A demonstration called "Miracle of Microwaves" was presented at the March 21st meeting by Frank Woods of the Southern Bell Telephone and Telegraph Company. The apparatus used in the demonstration included miniature towers similar to those now in use in the Bell System in the eastern part of the United States. Mr. Woods explained the characteristics of this phenomenon in layman's language which was readily understood by all members of the audience.

At the conclusion of the meeting, President Kinley made a final appeal to members present to make an all-out effort to recruit new members before the Chapter of the Year Contest closed. (Note: Although the chapter did not duplicate its record of last year when it won the 1950 chapter contest, it did win honorable mention this year for a tie for sixth place with Philadelphia and New York.)

At a joint meeting of the chapter's board of directors and executive committee, the following were appointed to fill vacancies caused by the transfer of chapter officers: James G. Prestwood, Jr., manager of Prestwood Electronics Company, was appointed second vice-president to succeed Lt. Col. Randolph Fite; Capt. Leonard Carlson, hqs. SCTC Camp Gordon, was appointed to succeed Lt. Col. Walter Hewitt as secretary.

Baltimore

One of the outstanding meetings of the chapter took place on March 14th at the U. S. Coast Guard Yard, Curtis Bay, Maryland.

Sacramento—The Winner!

(*See details, page* 40)

Chapter of the Year, 1951
SACRAMENTO
President—Paul W. Carrington
Past. Pres.—Milton G. Mauer
Secretary—C. A. House

Following luncheon in the yard cafeteria, the group was conducted on a tour of the Coast Guard installation which included an inspection of communications and electronic gear installed aboard an ocean weather ship and a remote-controlled lightship, as well as the gear in the electronics maintenance shops in the yard. The ship-building and repair facilities were also included in the tour. A guide accompanied each of the separate groups en route and explained the various installations and answered the many questions of the interested guests.

At the conclusion of the tour, the chapter members and guests assembled in the auditorium to see a movie in which the duties of the Coast Guard ocean weather ship were demonstrated including the rescue operations of a trans-Atlantic passenger plane. The film gave a dramatic portrayal of how the plane in distress was guided via radio signals to the weather ship where the ship's crew went overboard in lifeboats to rescue the persons from the disabled plane.

Boston

An authoritative discussion on modern military communications in the U. S. Army was presented by Colonel Harrod G. Miller, Commandant, The Signal School, Fort Monmouth, at Boston's April 26th meeting.

Chapter President Tom Halloran opened the meeting with a report on the annual convention in Chicago and pointed out preliminary plans for the 1952 convention in Philadelphia. He also suggested that the Boston Chapter be hosts for the AFCA annual meeting in 1954.

Continuing the drive for increased membership, Admiral Halloran reviewed the mission of the association and Edward A. Johnson, chairman of the membership committee, reported on the progress of the membership campaign. The meeting was then turned over to Raymond Meader, chairman of the program committee, who introduced Colonel Miller as the speaker of the evening.

Following Colonel Miller's talk, a very interesting and enjoyable question period was held. The thoughtful and searching questions asked were evidence of the sincere interest in all aspects of the colonel's talk.

A social hour and dinner preceded the meeting at the Boston Naval Shipyard.

Chicago

The chapter's March meeting was held jointly with the Institute of Radio Engineers and featured speakers on airborne military test installations, tube substitutions and techniques in TV receivers, and civil defense communications.

John C. Whittle, vice president of Rochester Chapter and manager o fgovernment sales for Eastman Kodak Co., and Captain John H. McElroy, USN, director of photographic division in Navy's Bureau of Aeronautics, at May meeting of Rochester Chapter. Capt. McElroy delivered address to AFCA members at the meeting. Details, page 54.

First on the prgram was Dr. John C. Bellamy, associate director of Cook Research Laboratories, who gave an illustrated talk on the subject of airborne military test installations. Dr. Bellamy described the gathering of data by magnetic tape recording in such frontier projects of instrumentation as parachute travel, guided missile work, and the "ditching" of pilotless B-17 airplanes. Specific information sought in the tests described included characteristics of travel, control functions, aircraft reaction to the atmosphere, and properties of the atmosphere itself.

The speaker stated that gear driven magnetic tape recording proved suitable to the heavy shock conditions met. Some type of frequency modulation had to be used for accurate tape recording of up to 50 series of data on a single tape. A constant reference frequency on the tape provided means of compensating the data, gathered in 5-minute runs of perhaps 700 readings per minute. Playback of the tapes on special equipment makes the data available for rapid IBM tabulation. Slides were shown of tape recording devices

WHO'S been hibernatin'?

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We haven't been hibernatin' . . . not by a long shot!

The fact is we've been too busy for words . . . and *have been* ever since those critical days of World War II when we produced tons and tons of radio and electronic equipment for the armed forces.

You know those fine resonant radios in Cadillacs and Buicks and other GM cars? They're our products. Last year we produced nearly 2,000,000 radios for cars, trucks and other vehicles . . . many more than any other builder in the business.

You see, we've really been busy . . . busy getting additional experience . . . busy acquiring greater facilities . . . busy finding new ways to increase production efficiency. And, today, we can truthfully say that we're better prepared than ever to serve our country. Just say the word. We're ready to go!

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DIVISION, GENERAL MOTORS CORPORATION
KOKOMO, INDIANA

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Area B: J. H. LaBrum, Packard Building, Philadelphia, Pa. *Delaware, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia*

Area C: Ralph S. Grist, So. Bell T&T Co., Atlanta, Ga., *Southeastern States along Atlantic and Gulf coasts—from North Carolina to Louisiana including Tennessee*

Area D: E. H. Mittanck, 711 Telephone Bldg., Dallas, Tex.. *New Mexico, Texas, Oklahoma, Arkanisas*

Area E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. *Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado*

Area F: H. L. Hoffman, 3761 S. Hill St., Los Angeles, Calif. *Arizona, Utah, Nevada, California, Idaho, Oregon, Montana and Washington*

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BOSTON: President—T. F. Halloran, General Communication Co., 530 Commonwealth Ave., Boston, Mass. Secretary — Mark T. Muller, Asst. PMS&T, M.I.T., Cambridge, Mass.

CHICAGO: President — Oliver Read, Radio News, 185 N. Wabash Ave., Chicago, Ill. Secretary—Raymond K. Fried, 111 W. Monroe St., Chicago, Ill.

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DECATUR: President—Robert J. Bangert, 1110 Albert St., Decatur, Ill. Secretary—O. D. Allinson, 340 S. 23rd St., Decatur, Ill.

EUROPEAN: President — I. P. Doctor, SigO, Frankfurt Mil. Post, APO 757, New York. Secretary—C. E. Laurendine, Comm. Gp., Bi-Partite Control Office, APO 757, New York.

FAR EAST: President—George I. Back, Sig Sec, GHQ, FEC, APO 500, San Francisco, Calif. Secretary—Luster R. Kleinknight, Sig Sec, GHQ, FEC, APO 500, San Francisco, Calif.

FORT MONMOUTH: President — Eugene A. Kenny, 11 Allen Ave., Fort Monmouth, N. J. Secretary—Mervin C. Bowers, 35 Russel Ave., Ft. Monmouth, N. J.

GULF COAST: President—John A. McDavid, 3380th TT Gp., Keesler AFB, Miss. Secretary —Lloyd E. Sunderland, OMR #680, Keesler AFB, Miss.

GREATER DETROIT: President—R. Foulkrod, Michigan Bell Tel. Co., 333 State St., Detroit, Mich. Secretary—D. J. Basolo, Michigan Bell Tel. Co., 1365 Cass Ave., Detroit, Mich.

KENTUCKY: Acting Pres.—Harry Bradshaw, 110 Delmont Drive, Lexington, Ky. Secretary —Clyde T. Burke, Lexington Signal Depot, Lexington, Ky.

LOUISIANA: President—Peter M. Miller, Jr., 1936 Robert St., New Orleans, La. Secretary —A. Bruce Hay, Southern Bell Tel & Tel Co., 520 Baronne St., New Orleans, La.

NEW YORK: President — Ellery W. Stone, American Cable & Radio Corp., 67 Broad St., New York, N. Y. Secretary—David Talley, International Tel & Tel Corp., 67 Broad St., New York, N. Y.

PHILADELPHIA: President—Harry A. Ehle, Int'l Resistance Co., 401 No. Broad St., Phila. Secretary—J. R. Curley, RCA Victor Div., Bldg. 15-7, Camden, N. J.

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STUDENT CHAPTERS

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NEW YORK UNIVERSITY, New York, N. Y. President—William S. Furman, 225 Sedgwick Ave., New York, 53, N. Y. Secretary—Martin Polan.

OHIO STATE UNIVERSITY, Columbus, O. President—Raymond E. Spence, Jr.; Secretary—Robert Borden.

OKLAHOMA A & M COLLEGE, Stillwater, Okla.

PURDUE UNIVERSITY: Lafayette, Ind. President—Norman C. Saunders; Secretary—C. Harold Butler.

STATE COLLEGE OF WASHINGTON, Pullman, Wash.

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Texas. President—Arthur Seybold; Secretary Frank N. Foster.

UNIVERSITY OF ALABAMA: University, Ala.

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

UNIVERSITY OF ILLINOIS: Urbana, Ill. President—Donald A. Jackson; Secretary—Milton F. Langer.

UTAH STATE AGRICULTURAL COLLEGE: President—Marvin H. Stoneberg, 290 N. 2nd E., Logan, Utah. Secretary—George L. Beutler, 133 E. Center, Smithfield, Utah.

National Headquarters Chapters Secretary: Julia B. Godfrey

CHAPTER NEWS

recovered from guided missile fragments found as much as 30 feet below ground. Spools of tape that had been broken in half and badly battered on impact were almost as good sources of data as undamaged reels, because the broken tape fragments can be patched with ordinary non-magnetic gummed tape, and played back with little discontinuity.

Dr. Howard Hafker, sales engineer of the RCA Tube Division, developed the topic of tube substitutions and techniques in TV receivers by functions of the tubes in groups within the TV receiver, from RF, video and sound IF, detector, output, separator, oscillator, and damper to rectifier and power supply. He outlined the critical considerations for each tube function and named the tube types that have been found to be interchangeable. He described the circuit changes considered permissible without confusing TV service men faced with tube replacement problems and without shortening tube life or impairing picture and sound clarity.

William J. McDonell, regional manager, central states region, Federal Communications Commission, enumerated the bands set aside by the FCC for civilian defense purposes in the amateur range. He pointed out that the separate disaster communications service set up two years ago can help in civilian defense. To straighten out allocations for 30 to 40 radio channels required for a bombed metropolitan area, the FCC will soon have hearings to draw on the experience of cities which have been going ahead on civil defense plans. Mr. McDonell concluded his talk with an illustration of the present system for communications control in the Chicago civil defense plan, indicating the volume and complexity of the job that would have to be done in the event of atom bomb attack.

Over 200 members of the AFCA and IRE attended the meeting, and the social hour and dinner which preceded it, at the Western Society of Engineers headquarters in downtown Chicago. AFCA Chapter Vice-President James H. Kellogg presided in the absence of President Oliver Read, and invited the IRE members to attend the AFCA national convention being held at the Drake Hotel in April. IRE Chairman Kipling Adams acknowledged the in-

Nothing can touch them!

these tiny Class "S" Relays from

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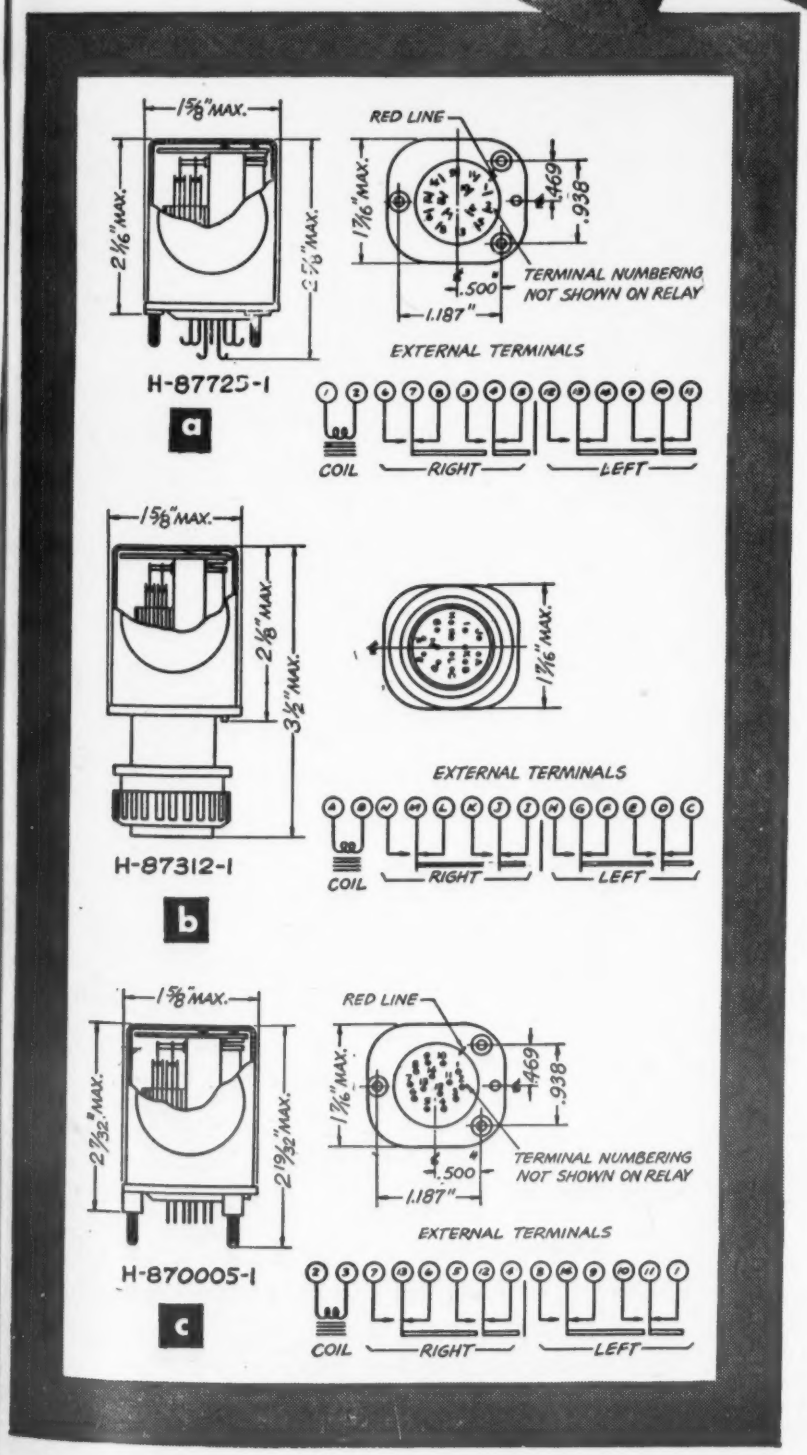
are HERMETICALLY SEALED



To give your product high performance standards, use relays that meet *aviation's* highest standards. These Automatic Electric Class "S" Relays meet them all!

small, light-weight—mount in any position in a restricted space...save valuable room, hold down weight.

resist shock and vibration—contact operation is dependable at vibration up to 10.5 G's.

protected from harmful conditions—operate in "ideal" atmosphere of dry nitrogen, sealed against dust, corrosion, atmospheric pressure changes and tampering.

versatile in application—as shown at left, Class "S" Relays are available with solder-or socket-type terminals...and with the contact arrangements *you* specify.

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RELAYS **SWITCHES**

AUTOMATIC ELECTRIC

CHICAGO

CHAPTER NEWS

vitation on behalf of their Chicago membership.

Cleveland

Another joint AFCA-IRE meeting took place on March 29th in Cleveland, with ninety members in attendance.

Held at Radio Station WHK, the meeting featured a technical presentation by J. Dobosy, consulting engineer, who discussed a new direct coupled, high efficiency, high fidelity amplifier. The subject was of special interest to those members who deal with audio frequencies and the application of audio frequency equipment to production, recording and associated problems.

A demonstration and a question and answer period concluded the evening's program.

Decatur

Captain Bernard Greenbaum of the Decatur Signal Depot spoke on "Signal Corps Intelligence Services" at the Decatur Chapter's March 21st meeting. His talk centered around the organization and functions of Signal Corps intelligence and security as used in a theater of operations in World War II and was of much interest to all members present.

Chapter President Robert J. Bangert and Edward C. Whitcomb were elected national council members to represent the chapter at the annual convention in Chicago.

Special guests of the chapter were Colonel Glenn H. Palmer, Signal Officer of the Fifth Army, and Lt. Colonel Guy M. Blencoe.

Detroit

A discussion on the "After-effects of Atomic Bombing," illustrated with slides, was presented at the Greater Detroit Chapter meeting on March 22nd by M. T. Buhl of the operations and engineering department of the American Telephone and Telegraph Company and was based on his studies under the joint supervision of the Atomic Energy Commission and the National Security Resources Board.

An effective introduction to Mr. Buhl's talk was the showing of the film "You Can Beat the A-Bomb," which covered the expected effects from an atomic bombing and the steps to be taken to mitigate them.

Another interesting film shown on the program covered the laying of the two new Tampa to Havana submarine cables including a new type of repeater which is built as a part of the cable itself.

George H. Goldstone and R. J. McElroy were elected national council members from the chapter for the ensuing year. Some fifty members and guests were present.

Raymond Foulkrod, chief engineer of the Michigan Bell Telephone Company, was elected president of the chapter at the annual business meeting on April 27th. Other officers chosen were: George H. Goldstone, re-elected 1st vice-president; J. B. Kershaw, 2nd vice-president; L. J. Ritter, 3rd vice-president; secretary—D. J. Basloo, J. W. Ottinger, assistant secretary; treasurer — W. C. Edwards; assistant treasurer — D. R. Olson.

A report on the annual convention in Chicago was given by Mr. Goldstone, who stated that considerable discusion had been given at the forums to the practice of the government giving contracts for prototypes to one particular manufacturer and then allotting the contract to produce the item to another manufacturer.

Col. John A. McDavid, first president of new Gulf Coast Chapter, receives AFCA charter from AFCA Executive Secretary George P. Dixon.

At first regular meeting of Gulf Coast Chapter, L to R: Lt. Col. Edwin L. Wood, W. F. Oliver (seated), James C. Dabney, Col. John A. McDavid, AFCA Exec. Sec. George P. Dixon, Maj. Lloyd E. Sunderland, Charles F. Wilder, and Curtis W. Hollister.

A discussion on Reserve Training was conducted and the general feeling was that the AFCA should do more to promote a more effective reserve training program for signal units. It was pointed out that the training program appeared to be handicapped through lack of equipment and changes in policies for conducting training by the services.

The subject of increasing attendance at meetings was brought up and it was suggested that meetings be held more frequently, that programs should include technical demonstrations of equipment, and that some meetings be held at the various universities in the area with the engineering students invited to attend.

Fort Monmouth

Attendance was clocked at 500 on March 29th when the chapter featured a lecture and demonstration on color television by Arthur V. Loughren, vice president of Hazeltine Electronics Corporation.

An added attraction on the program was a thirty-minute magician show.

Prior to the meeting, members and guests met for a social hour and buffet dinner at Gibbs Hall.

The role of the Signal Corps in the development of instruments used in atomic warfare was described by Dr. R. A. Weiss, chief of the nucleonics branch of the Signal Corps Engineering Laboratories, in an address before 300 members of the chapter, May 25, at Gibbs Hall.

Col. W. A. Beasley, deputy commander of SCEL, also addressed the group, reporting on the AFCA national convention in Chicago, which he attended as national committeeman of the Fort Monmouth Chapter.

Dr. Weiss's talk, highlighted with sight and sound demonstrations of equipment, also dealt with the nature of nuclear radiation emitted by an atomic bomb explosion, and the problems of measuring radiation in contaminated areas. Several instruments used in such measurements were displayed.

The chapter president, Col. E. A. Kenny, presided at the May 25 meeting which followed a buffet dinner. It was the final meeting of the current season, except for a clambake which will be held later.

Gulf Coast

The Gulf Coast Chapter officially received its AFCA charter on April 5th when Brig. General Ivan L. Farman, Deputy Director of Communications, USAF, and Colonel George P. Dixon, AFCA Executive Secretary, came down from Washington to be special guests at the chapter's first regular meeting at Keesler Air Force Base, Miss.

In presenting the charter to Colonel John A. McDavid, first president of the chapter, Colonel Dixon reviewed the aims and objectives of the association

20th year as pioneer

DuMont

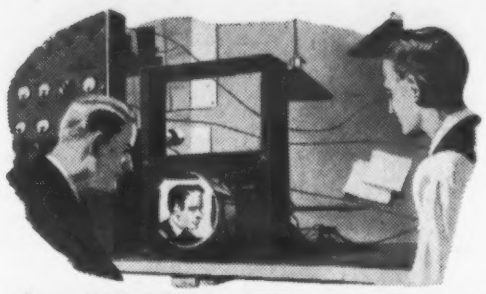
A great and exciting thing happened in 1931. A man who believed that electronics should be seen, not just heard, began to put the "vision" into television. Dr. Allen B. Du Mont took a laboratory curiosity called a cathode ray tube, and he took it seriously. From it, he developed the television picture tube.

Later, the Du Mont Laboratories developed many different types of cathode ray tubes for wonderful new uses: Radar, Loran for guiding ships and planes in all weather, devices that could "paint pictures" of light and sound waves, look inside a metal bar, analyze a human heartbeat, or perform countless other miracles to aid industry, science, medicine . . . and national defense.

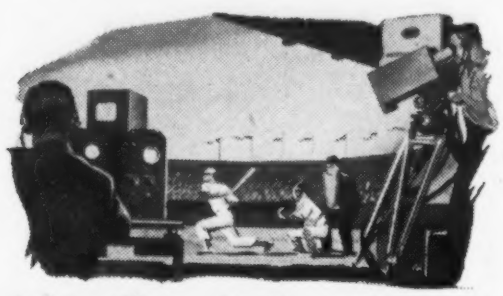
But the Electronic Age is scarcely born. Still greater developments will come in the next twenty years to help make America brighter, happier, more secure. A great many of them will again come from the Du Mont Laboratories and factories . . . for in electronics, Du Mont has the habit of being first with the finest.

20th YEAR AS PIONEER DU MONT

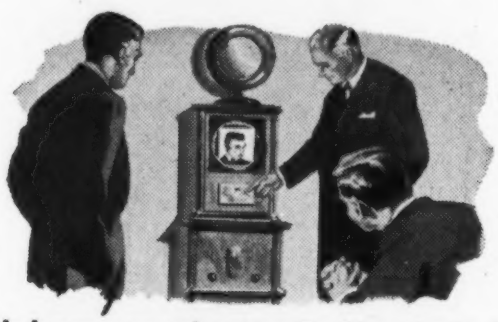
First with the finest in Electronics



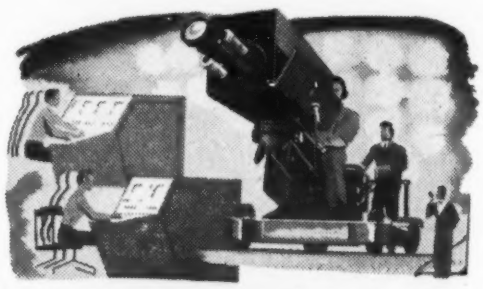
First in development—*When Dr. Du Mont started his research in 1931, the cathode ray tube was a laboratory curiosity. It was his development of this tube that made electronic television commercially practical.*



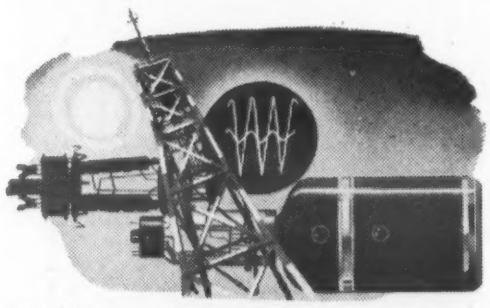
First in telecasting—*Du Mont operates the first television network. Its key station, WABD, New York, was the first fully equipped, high-powered station on the air, and was first with daytime programming.*



First with home receivers—*Du Mont built the first commercial home receivers in 1939. After the war, in 1946, Du Mont was first on the market with a line of fine receivers; first with the 20-inch and 30-inch tubes—the world's largest.*



First in precision electronics—*Du Mont is the world's foremost maker of scientific precision instruments utilizing the electronic cathode ray tube.*



First in station equipment—*Du Mont is a leading maker of high-fidelity, precision broadcasting equipment, and has planned, designed, and built many of the country's leading television stations.*

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and expressed his appreciation for the excellent support given by the Air Force. General Farman brought a message from Maj. General Francis L. Ankenbrandt, Director of Communications of the Air Force and a national director of the AFCA, who had been unable to attend the meeting.

The AFCA members and guests were welcomed to the base by Brig. General James F. Powell, commanding general of Keesler Air Force Base, and were led on a tour of the electronics school.

Officers elected to head the chapter during its first year were: president—Col. John A. McDavid, commanding officer, 3380th Tech. Tng. Group; 1st vice-president — Lt. Col. Edwin L. Wood, director of the air traffic control department, 2nd vice-president—James C. Dabney, Southern Bell Telephone & Telegraph Co.; 3rd vice-president—Charles F. Wilder, Southern Bell Telephone & Telegraph; secretary—Maj. Lloyd E. Sunderland, asst. director, electronics fundamentals department, Keesler AF Base; treasurer—Curtis W. Hollister, Civil Service senior instructor, electronics fundamentals department, Keesler AF Base. Major Reuben A. Krutz of Keesler was appointed chairman of the program committee.

A cocktail party at the Magnolia Room of the White House Hotel, and a seafood banquet at the Paradise Point restaurant concluded the day.

Louisiana

Plans to reactivate the chapter are being made by Bruce Hay, chapter secretary, who attended the annual convention in Chicago and took part in the business meetings. Also present at the convention was Joe D. Bloom, Jr., of Station WWL, New Orleans.

New York

Fleet Admiral William S, Halsey, USN(ret.), of World War II fame, was guest speaker at New York's Navy Night meeting on February 28th.

Now president of the International Telecommunication Laboratories and a director of the International Telephone and Telegraph Corporation, Admiral Halsey emphasized the great importance of radio, radar and electronics to the Navy at the present time. He also spoke of his early days in the Navy and his efforts to master the Morse code and the flag signals used for communications prior to World War I, and related a number of amusing incidents concerning Naval communications prior to and during World War II.

Distinguished guests present included: Capt. Goulett of the Office of the Director of Naval Communications; Dr. Paul Rosenberg, president of the Institute of Navigation; Miss Elizabeth Withington, president of the New York Section of the Institute of Navigation; Maj. Gen. Roger B. Colton, USA-(Ret.), president of Federal Telecommunication Laboratories; and Maj. Gen. Harry C. Ingles, USA(Ret.), president of RCA Communications.

The Air Force was host to the New York Chapter for its March 28th meeting at Mitchel AFB, Hempstead, N. Y.

Guest speakers were Major General Willis H. Hale, commanding general, Continental Air Command, who discussed Air Force Reserve activities, the present recall program, and atomic bombing; and Brig. General Wallace G. Smith, commanding general of the Airways and Air Communications Service, who explained the functions and operations of the AACS.

The new Number 51 Type Reperforator Switching System used by the Air Force within the continental United States was described by Lt. Aimes of USAF, Hq, Washington, D. C.

Among the 160 members and guests in attendance were Colonel Frank E. Kidwell, the new First Army signal officer who invited the chapter to hold its next meeting at Governors Island under the auspices of the Signal Corps. The guests also numbered several members from the New York Section of the Institute of Navigation.

More than 175 members and guests turned out for the chapter meeting at Governors Island on April 24th. Col. Frank E. Kidwell, signal officer, First Army, arranged a most interesting program which included a display of the latest Signal Corps field communication equipment as well as an excellent cocktail party and dinner. Lt. General Willis D. Crittenberger, CG, First Army, was a guest of the chapter.

The special display of field communication equipment was made available by the Signal Corps Engineering Laboratories of Fort Monmouth and comprised the new type "handy-talkie," the AN/GRC-3 "building block" radio set, new lightweight field telephone wire, portable field telephone switchboard model SB-22, radiation detectors, and numerous other items for improving Army communications.

Guest speaker at the dinner-meeting was Dr. A. C. Walker of the Bell Telephone Laboratories who described the methods developed during the last year to grow crystals under laboratory controls and displayed a number of the artificially grown crystals. A motion picture in color, which showed the process he had developed for growing these crystals, concluded Dr. Walker's interesting talk.

Chapter President Ellery W. Stone opened the meeting by introducing a number of distinguished members and guests present. They included: Maj. General H. C. Ingles, president of RCA Communications, Inc.; Maj. General George Van Deusen, president of RCA Institutes; Commodore J. B. Dow, executive vice president of Hazeltine Laboratories; Dr. Allen B. DuMont, president of Allen B. DuMont Laboratories; Brig. General A. W. Marriner, director of aviation of the International Telephone & Telegraph Corp.; George W. Bailey, executive secretary of the IRE and president of the ARRL.

A report on the national annual meeting in Chicago was made by Col. Ted Bartlett of RCA who headed the large New York delegation to the convention.

On May 11th the New York Chapter participated in awards to two Signal Corps ROTC students at New York University who were winners in the AFCA-Signal Corps photography contest. Lt. Colonel Ludwig R. Engler, chairman of the chapter's reserve affairs committee, represented the chap-

New York Chapter dinner following inspection of Signal Corps display Governors Island. Left to right: T. L. Bartlett, RCA Frequency Bureau; A. W. Marriner, aviation director IT&&T; G. W. Bailey, exec. secty., IRE and pres. ARRL; J. B. Dow, exec. v.p., Hazeltine Labs; G. Van Deusen, pres., RCA Institutes; Dr. A. C. Walker, Bell Tel Labs; Col. F. E. Kidwell, signal officer, 1st Army; E. W. Stone, pres., All America Cable & Radio and pres., AFCA N. Y. Chapter; Dr. Allen B. DuMont, pres., DuMont Labc; and H. C. Ingles, pres., RCA Communications.

A word from you...and we'll come RUNNING!

With sleeves rolled up, Crosley is ready to give the military immediate help in tackling defense projects in the field of electronics.

We're extremely proud of the praise we received from the armed services for our work on the proximity fuse during World War II. We were first to be called in on the development of the fuse, and first to get into production on it.

Today we're well-equipped with advanced technical knowledge and expanded production facilities to take on tough electronic assignments and again fulfill our promise of a good job . . . well and speedily done.

As the largest manufacturing division of AVCO, Crosley offers you 3,300,000 square feet of floor space in well-dispersed plants equipped with the most modern automatic machinery and materials handling systems.

We place at your disposal the services of one of America's foremost staffs of electronic scientists, designers and engineers, backed by a smooth-operating team of skilled workers.

Of 3,300,000 square feet of space in Crosley plants, 700,000 feet are now being used for the production of television and radio equipment, with a capacity of 3,000 sets per day.

Yes, Crosley is set to serve you fast and well. Call, wire, or write, and we'll come running!

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AVCO MANUFACTURING CORPORATION

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ter and presented the awards on behalf of the association to Lester Pfeffer, the first prize winner, and Roger Berry, general prize winner.

Philadelphia

A demonstration of the automatic extended dialing and message accounting equipment of the Bell Telephone Company of Pennsylvania highlighted the Philadelphia Chapter's meeting on April 24th. Preceded by cocktails and dinner at The Tavern in Cynwyd, the meeting was opened by Carl Freehafer of the Bell Telephone Co. who, in the absence of Chapter President Harry Ehle, reported on the events of the recent national AFCA convention and announced that the Philadelphia Chapter had been given the honor of playing host to the association at the 1952 convention.

The balance of the evening was spent in inspecting the automatic extended dialing and message accounting equipment at the Bell Telephone Company Welsh Valley offices. The equipment, which was designed as an automatic system of recording telephone calls on a three inch oiled tape, prints such data as the telephone number making the call, a trunk line number, time in minutes and tenth minutes, and the telephone number called. The tape is pierced by a perforator, capable of handling 100 trunk lines, which is located in an outlying exchange. From this point, the tapes are forwarded to the central office where they are automatically sorted through an assembler, computed, and printed. The printed tapes are then sent to the billing department for calculating the number of essages or total charges for individual customers, which is the only step in the whole process which is done manually.

The entire demonstration was extremely interesting and was an indication of the possibility of information handling equipment for large scale commercial operations.

Pittsburgh

The Bell Telephone Company of Pennsylvania was host to the Pittsburgh Chapter for its March 29th meeting. Mr. J. C. Longstreth, vice president and general manager of the telephone company, and a staunch supporter of the chapter, welcomed the 125 members and guests and emphasized the aims and purposes of the association.

Following dinner in the Bell Telephone dining room, the group was divided into units of 12 to 15 and conducted on a tour of the company's plant school. The tour covered methods and equipment used in training installers, repairmen, cable splicers and linemen. Set up to provide practical experience as well as theoretical knowledge, the school contains displays of houses, telephone poles, private branch

A record turnout of the Sacramento Chapter recently honored Brig. Gen. A. M. ("Pete") Shearer, center, on his retirement from service as Signal Corps chief of procurement and distribution. Left to right: Dr. R. A. Scalapino, asst. prof., political science, U. of Calif.; Gen. Shearer; Sacramento Chapter pres. Paul Carrington; and Maj. Gen. W. M. Robertson (ret), California civil defense chief.

exchanges, central office equipment where the trainees actually install telephones, splice cable, extend line drop wires, install private branch exchanges and also experience actual maintenance of central office equipment.

During the month of March, the chapter signed up as members some fifty students from the Carnegie Institute of Technology. It plans to suuplement the students' classroom knowledge in many practical ways, such as guided tours, group meetings, technical lectures and demonstrations, etc.

Rochester

Captain John H. McElroy, USN, director of the photographic division, Navy Bureau of Aeronautics, was guest speaker at the May meeting of the Rochester Chapter in the Rochester Chamber of Commerce attended by an overflow audience. Chapter President Joseph C. Wilson, president of the Haloid Company, presided.

"When we have problems to solve, we come to Rochester," said Captain McElroy, "and Rochester industries always come through." He mentioned faster shutters, automatic exposure controls, new filters, and lenses as among the vital new items of equipment developed by Rochester photographic companies.

Accompanied by two aides, Lt. Comdr. P. M. Sands and C. R. Shirley, Captain McElroy visited Bausch & Lomb Optical Company and Eastman Kodak plants to see developments in research projects.

A film, "The Last Days of Hungnam," depicting actual combat scenes of the Navy and Marine Corps in Korea was shown at the chapter meeting.

Captain McElroy declared Navy officials are keenly interested in the Eastman House photographic center and already have contributed items of historic interest. He also assured Beaumont Newhall, director of Eastman House, that a print of the Hungman film soon would be forthcoming for the photographic center's permanent collection.

Sacramento

A demonstration of micro-wave radio relay transmission by R. E. Barrington of the Pacific Telephone and Telegraph Company featured the chapter's March 12th meeting at the Sacramento Signal Depot auditorium. The program was arranged by Col. "Milt" Mauer, past president of the chapter, who is now on military leave from the Pacific Telephone and Telegraph Company and has just recently been transferred from McClellan Field, California, to the Air Materiel Command, Wright Field, Ohio.

The micro-wave radio relay system of transmitting telephone calls and television programs was developed through the wartime research of the Bell Telephone Laboratories, and is now in use in various parts of the country, including a system installed last fall between Los Angeles and San Francisco. Using a miniature reproduction of the system, Mr. Barrington demonstrated how microwaves are beamed like a searchlight in a direct line from point to point. He also explained that these high-frequency electrical waves do not follow the curvatures of the earth, thereby making it necessary to construct radio relay stations at intervals from 35 to 40 miles apart along the route to catch the beams, amplify them and redirect them to the next station in line.

Following the demonstration, a color motion picture of the "Battle of Midway" was shown and refreshments were provided by Program Chairman C. A. Bairos.

Photography was the theme of the

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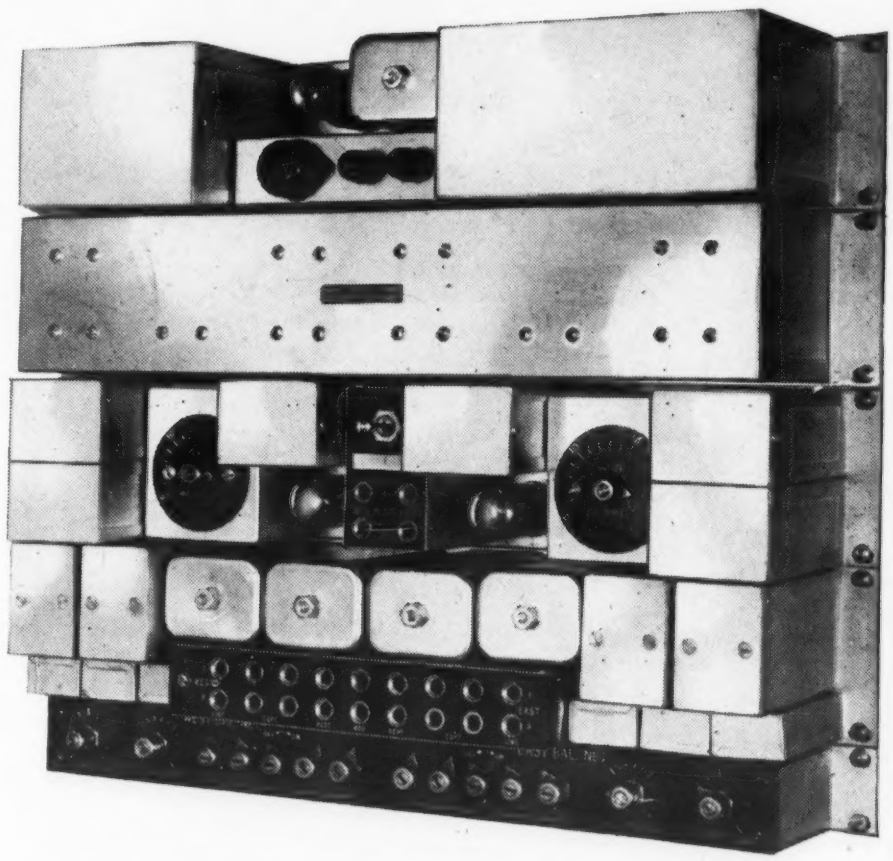

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CHAPTER NEWS

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To round out the photographic program, cameras and other equipment were displayed and demonstrated through the courtesy of the McCurry Photo Company of Sacramento.

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South Carolina

The fourth meeting of the South Carolina Chapter was held at the Charleston Naval Base and featured Dr. J. O. Perrine, assistant vice president of the American Telephone & Telegraph Company, and his lecture-demonstration, "More Waves, More Words, Less Wires." Dr. Perrine met with the same enthusiastic response which he experienced before other AFCA chapters during the past two years.

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Among the ninety-five members and guests present were Ralph Grist, president of the Atlanta Chapter, and William H. Mansfield, AFCA national director.

Chapter members on duty at the Naval base and President Young arranged the details of the excellent meeting with the assistance of Jack Pickell, chapter treasurer.

Washington

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The arrangements for the visit to the Naval Academy were made by Capt. W. R. Smedberg III, head of the department of electrical engineering at the Naval Academy, Capt. R. R. Hay, USN, Naval Reserve Liaison Officer for the Division of Naval Communications, and Col. Percy G. Black, chairman of the chapter's program committee.

Vice Admiral Walter S. Anderson, USN(Ret.), director of the International Automatic Electric Co., and Rear Admiral Joseph R. Redman, USN.(Ret.), wartime Chief of Naval Communications and now vice president of the Western Union Telegraph Co., were top-ranking retired naval officers, now in the communications field, who attended the affair.

The athletic events included the Navy-Dartmouth baseball game, the Navy-Penn State track meet, and the Navy-Columbia-Cornell crew races.

STUDENT CHAPTERS

Ohio State University

An AFCA student chapter at Ohio State University officially came into being on March 16th when their petition for charter was approved by national headquarters. Organized through the efforts of Lt. Col. Thomas W. Riley, Assistant PMS&T, the chapter has held several meetings and elected officers as follows: President—Raymond E. Spence, Jr.; 1st vice-president—Bernard Barnes; 2nd vice-president—Ed Pienkowski; secretary—Robert Borden; treasurer—Delmar Case.

The charter was formally presented to the chapter by Lt. Col. Riley on April 11th.

Purdue University

The charter of the new AFCA chapter at Purdue was presented to Norman C. Saunders, chapter president, during the national convention in Chicago. The chapter was formed with the assistance of Lt. Col. Norbert C. Miller, Asst. PMS&T.

Chapter officers are: President—Norman C. Saunders; vice-president—Thomas G. Marshall; secretary—C. Harold Butler.

Accompanying President Saunders to the convention were Lt. Col. Miller and Chapter Secretary Butler.

University of Illinois

Also chartered at the AFCA convention was the new student chapter at the University of Illinois which was organized by Lt. Col. Bruce W. Caron, Asst. PMS&T.

Officers were chosen at the chapter's first meeting as follows: President—Donald A. Jackson; vice-president—William A. Lynch; treasurer—Paul F. Wilkinson; secretary—Milton F. Langer.

Secretary Langer accepted the charter on behalf of the chapter at the annual banquet. Also present at the convention from the University of Illinois were S. J. Kowalski, E. R. Campbell, W. A. Lynch, and Lt. Col. Caron.

Telephoto and facsimile work was the subject of the chapter's April meeting, and in May the chapter was invited to attend a meeting of the Decatur Chapter which featured a lecture-demonstration on color television.

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Washington

More than 140 members of the Washington chapter participated in the chapter's final meeting of the season at the Naval Academy on May 5th. The program included a luncheon at the Naval Academy Alumni House, a tour of the Academy exhibits of electronics equipment, electrical apparatus and marine engineering, the two amateur radio stations, and attendance at three Naval Academy athletic contests.

The arrangements for the visit to the Naval Academy were made by Capt. W. R. Smedberg III, head of the department of electrical engineering at the Naval Academy, Capt. R. R. Hay, USN, Naval Reserve Liaison Officer for the Division of Naval Communications, and Col. Percy G. Black, chairman of the chapter's program committee.

Vice Admiral Walter S. Anderson, USN(Ret.), director of the International Automatic Electric Co., and Rear Admiral Joseph R. Redman, USN. (Ret.), wartime Chief of Naval Communications and now vice president of the Western Union Telegraph Co., were top-ranking retired naval officers, now in the communications field, who attended the affair.

The athletic events included the Navy-Dartmouth baseball game, the Navy-Penn State track meet, and the Navy-Columbia-Cornell crew races.

STUDENT CHAPTERS

Ohio State University

An AFCA student chapter at Ohio State University officially came into being on March 16th when their petition for charter was approved by national headquarters. Organized through the efforts of Lt. Col. Thomas W. Riley, Assistant PMS&T, the chapter has held several meetings and elected officers as follows: President—Raymond E. Spence, Jr.; 1st vice-president—Bernard Barnes; 2nd vice-president—Ed Pienkowski; secretary—Robert Borden; treasurer—Delmar Case.

The charter was formally presented to the chapter by Lt. Col. Riley on April 11th.

Purdue University

The charter of the new AFCA chapter at Purdue was presented to Norman C. Saunders, chapter president, during the national convention in Chicago. The chapter was formed with the assistance of Lt. Col. Norbert C. Miller, Asst. PMS&T.

Chapter officers are: President—Norman C. Saunders; vice-president—Thomas G. Marshall; secretary—C. Harold Butler.

Accompanying President Saunders to the convention were Lt. Col. Miller and Chapter Secretary Butler.

University of Illinois

Also chartered at the AFCA convention was the new student chapter at the University of Illinois which was organized by Lt. Col. Bruce W. Caron, Asst. PMS&T.

Officers were chosen at the chapter's first meeting as follows: President—Donald A. Jackson; vice-president—William A. Lynch; treasurer—Paul F. Wilkinson; secretary—Milton F. Langer.

Secretary Langer accepted the charter on behalf of the chapter at the annual banquet. Also present at the convention from the University of Illinois were S. J. Kowalski, E. R. Campbell, W. A. Lynch, and Lt. Col. Caron.

Telephoto and facsimile work was the subject of the chapter's April meeting, and in May the chapter was invited to attend a meeting of the Decatur Chapter which featured a lecture-demonstration on color television.

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NEWS—SERVICES and INDUSTRY

communications - electronics - photography

Dayton Aircraft Conference

In the first such joint meeting of its kind—and one which proved so successful that similar meetings in other industries will undoubtedly follow—defense production officials flew from Washington to Wright-Patterson Air Force Base in Dayton, Ohio, April 24, to review at first hand progress in aircraft and electronic equipment production.

Sponsored by the Defense Production Administration, the Dayton conference brought together top-level officials in the defense and military agencies, including representatives of DPA's production executive committee, aircraft production board, and electronics production board to discuss production matters directly with officers of the Air Force and the Navy who formulate and schedule armed forces' requirements for military defense production.

The session, which reflected the importance placed on the electronics and communications development programs in the nation's defense planning, served to demonstrate how much has been accomplished to date and plans for broadening the base of industrial participation in the production of highly complex equipment to fill the increasing needs of the next several years. The trip was one of a series of visits to key installations to permit first hand examination of military equipment being developed by the services which will shortly go into production.

The importance of the conference is indicated by the participation of Defense Mobilizer Charles E. Wilson; Defense Production Administrator William H. Harrison (who recently resigned from that post); National Production Authority Administrator Manly Fleischman; and J. D. Small, chairman of the Munitions Board.

During the conference, much of which dealt with classified information, participants discussed substitution of materials for currently critical materials and there was a large display of electronics and communications equipment, including bombing and navigation radars, fire control radars, miniature tubes and bearings and air and ground communications equipment which brought home to the top-level defense agency personnel the complexities of this type of equipment being produced for the Air Force program. This modern equipment is more complex than much of the radio and television industry—which has only produced commercial equipment in the last five years—can handle to meet the first phases of the Air Force program.

However, it was pointed out at the conference, all members of the industry are being brought into the second phases of the program to give them sufficient time to develop the know-how and equipment for meeting production needs. The military, it was emphasized, is making these industry members acquainted with the picture so they can do the job.

The conference also served to demonstrate the unity existing between the various branches of the armed services in the aircraft and electronics production program and showed the intention of the military to bring as many industry people as possible into the program.

As part of this "get acquainted" program, extensive displays of aviation electronics and communications equipment and related components were also shown in New York City and Chicago during May by the Bureau of Aeronautics of the Navy, and the Air Force for the benefit of management and technical representatives of current potential subcontractors.

Continued Production Bright Spot

Keynoting the importance of the electronics-communications manufacturing industry to the national defense program, Acting Defense Production Administrator Edwin T. Gibson told the annual convention of the Radio-Television Manufacturers Association in Chicago June 7 that, for the set and component makers, the dim spots in the present defense preparedness program are balanced by the brighter side of the picture.

Although dark spots in the outlook include the view that the full impact of materials shortages will be felt next year, conservation of all metals will continue to be required, and shortages of technically trained manpower will become more serious, Mr. Gibson said. The brighter side includes the fact that the industry has not been asked to give up civilian production entirely, producers will be certain of getting critical materials for defense and defense-supporting programs under the controlled materials plan, and all procurement agencies are being guided by the principle of giving contracts to the largest number of companies possible.

Chase NPA Communications Deputy

A highly experienced telephone official with 30 years experience in the field, Warren H. Chase, assistant vice president of the Ohio Bell Telephone Company, became deputy director of the National Production Authority's communications equipment division on May 1. He will serve under Luther W. Hill, director of the division, who is on leave from the presidency of the Carolina Telephone & Telegraph Company.

Mr. Chase, who has been granted a leave of absence for six months by the Ohio Bell to accept the NPA assignment, will be responsible for organizing the communications equipment division, and for its work of allocating strategic materials to the telephone and telegraph communications manufacturers for their production requirements, both for the armed services and for civilian communications services.

In addition to his commercial telephone operating experience, Mr. Chase has a broad knowledge of civil defense communications requirements, and has been serving as a member of the executive committee for civil defense established by the mayor of Cleveland. He is chairman of the Red Cross disaster communications committee, and is a member of the U. S. Power Squadron and U. S. Coast Guard Auxiliary on Lake Erie.

FCC

Coy Nomination Confirmed

With unanimous approval by the Senate Interstate and Foreign Commerce Committee at its first regular meeting following the hearings on the nomination of FCC Chairman Wayne Coy for a full seven-year term on the Commission, Chairman Coy's reappointment was endorsed by the Senate the following day without debate. The accomplishments of Chairman Coy were lauded highly by Interstate and Foreign Commerce Committee Chairman Ed. C. Johnson during the brief hearings on his confirmation, and no opposition was expressed.

Bartley Seen as FCC Candidate

Strongest possibility to succeed Miss Frieda Hennock as FCC Commissioner, when the latter is confirmed by the Senate to a U. S. District judgeship in New York, is generally considered to be Robert T. Bartley, administrative assistant to House Speaker Sam Rayburn. Mr. Bartley served for more than three years, from 1934-37, as director of the

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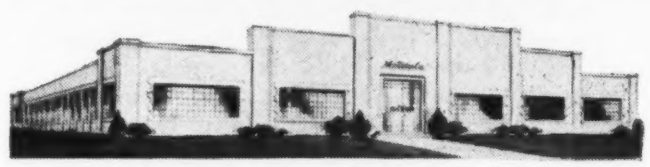
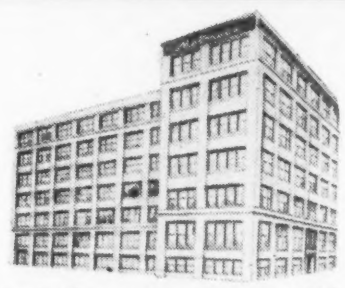


Quincy, Ill. Plant No. 2



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Selection of General Back As Chief Signal Officer Lauded

Korean Experience Seen as Invaluable to Corps Progress

The appointment of Maj. Gen. George I. Back as Chief Signal Officer of the Army, which he officially became upon taking his oath of office May 2 at GHQ of the Far East Command in Tokyo, has brought out expressions of universal approval. With his reputation for knowledge developed from wide experience in his field, for high character and integrity, and for a fine and friendly personality, it is regarded as certain that the morale of the entire Signal Corps will continue to be strengthened under his leadership.

It is also brought out, in the comment on his appointment as chief of the Signal Corps, that his most recent experience is of great importance to the future progress and strengthening of the Signal Corps, since he brings not only a first-hand leadership and knowledge of the combat conditions and requirements from the Korean theater, but also a most notable record of achievement in military communications, both operational and logistical, in the bitter and difficult fighting against the communist masses of troops.

Gen. Back, like his predecessor, Maj. Gen. S. B. Akin, came to the top Signal Corps post from assignment as chief signal officer of the Far East Command and chief of the civil communications section of the Supreme Command Allied Powers. During World War II Gen. Back held important posts under Gen. Mark Clark in the Mediterranean Theater as deputy chief signal officer of the Allied Force Headquarters and as chief signal officer of the Mediterranean Theater for the U.S. Army Forces. Earlier in that war, as director of the distribution section of the procurement and distribution division, Gen. Back was understood to have played a leading role in establishing the process and system of shipping Signal Corps equipment and supplies to the combat theaters, which throughout the entire war was so efficient that at no time were Signal Corps and Army and Army Air Force stations and troops without adequate communications apparatus and components.

Born in Sioux City, Iowa, and educated at Morningside College, in that city, from which he received a B.A. degree in 1921, Gen. Back was commissioned a second lieutenant in the Signal Officers Reserve Corps in 1917 and received his Regular Army commission as a first lieutenant in the Signal Corps in 1920.

Following the latter appointment Gen. Back became a student at Yale University where he studied technical instruction in communications engineering. In 1921 he went to Hawaii for company duty and in 1922 was assigned as assistant signal officer, Hawaiian Department. Returning to the States in 1924 he was assigned to the research and engineering division of the office of the Chief Signal Officer, where he remained until 1929. From 1929 to 1933 he was assigned to the Signal Corps Engineering Laboratories at Ft. Monmouth, and from 1933 to 1934 was a student at the Signal School there.

In 1934 Gen. Back became officer-in-charge of the plant and traffic division, office of the Chief Signal Officer. He left Washington in 1938 to enter the Command and General Staff School at Fort Leavenworth, Kansas, and after graduation in 1939 he was assigned as secretary of the Signal Corps Board at Ft. Monmouth. In 1941 he went to the Army War College, Washington, as assistant signal officer, and in March 1942 he entered the office of the Chief Signal Officer as executive officer of the signal supply services.

There is an added interest among the AFCA in Gen. Back's elevation to the Signal Corps chieftancy, since the new CSO has been a strong supporter of the AFCA since the association's beginning. He was president of the Far East Chapter since its inception, about three and a half years ago, until he left for the U.S. this May to take up his new duties in Washington.

Maj. Gen. George I. Back, the new Chief Signal Officer of the Army. (Photo shows Gen. Back without added stars, since a newer photo had not yet been made as SIGNAL went to press.)

NEWS

FCC telegraph division, and for eight years as a broadcasting regional network vice president, and as director of government relations and war broadcasting activities with the National Association of Broadcasters.

If President Truman should decide to continue the policy of having a woman FCC commissioner, a logical possibility would be Mrs. Fanney H. Litvin who, with her continuous service since 1928 in the legal department of the FCC and its predecessor, has the longest record of any staff official on the commission. Mrs. Litvin's name was understood to have been urged by Miss Hennock to President Truman.

There were also two other names mentioned for the FCC vacancy. They were Theodore Granik, moderator of the American Forum of the Air, and Commission General Counsel Benedict P. Cottone.

In the event of his selection for the FCC commissionership, Mr. Bartley's background and capabilities will bring a definite contribution to the commission in his previous knowledge of that agency's functioning in common carrier communications. His experience and knowledge of Congressional activities, gained through his experience as the top assistant to Speaker Rayburn, will also be a most valuable benefit for the FCC. Before he joined the FCC in 1934, Mr. Bartley had also obtained a factual background of the telephone industry in his assignment as the principal assistant to Interstate Commerce Commissioner Walter M. W. Splawn, in the latter's extensive study of utility holding companies and the telephone and telegraph industries for the House Interstate Commerce Committee.

Two Ounce Amplifier

A tiny electronic amplifier no larger than a ladies compact, weighing less than two ounces and capable of magnifying impulses three million times has been developed in the research laboratories of the Bendix Radio Division of Bendix Aviation Corp. Wilbur L. Webb, director of research and engineering, in making the announcement, stated that the tiny amplifier presents an entirely new concept of miniaturization of electronic equipment.

Mr. Webb pointed out that conventional amplifiers with similar character-

istics and several times larger in size normally weigh upward of 30 ounces and contain at least 240 parts, whereas the new amplifier requires only 35 separate parts. Because of its compactness and plug-in design, replacement of the tiny amplifier can be made in a matter of seconds. Its cost in mass production should be small enough to consider it an expendable item replaceable by a complete new unit when maintenance is required.

New Color Duplicating Film

Ansco, division of General Aniline & Film Corp., recently announced a new color duplicating film, designated as Type "638," which has been designed to reproduce Ansco Color Transparencies by contact or projection printing methods. A reversible printing film with a heavy clear base, it may be used with an ordinary enlarger or contact printer for reproducing Ansco color transparencies.

New Low-Priced Camera Outfits

Three new low-priced camera outfits were also recently announced by Ansco. Packaging three of its most popular cameras, the Flash Clipper, the Rediflex, and the Junior Press Camera, in luggage-type cases with carrying straps, Ansco has assembled compact outfits furnishing a complete selection of everything needed for picture taking by day or night. Each kit contains a camera, film, flash unit, flashlamps, batteries, and portrait attachment. The kits have roomy sections which provide plenty of space for extra rolls of film or other accessories users may wish to carry.

Film Spools and Tubes Wanted

As a result of material shortages Ansco is now offering payment for returned quantities of certain types of film spools and tubes. Usable Ansco film spools in the 35mm, 620 and 120 sizes, and 35mm Leica-type spools of other makes will be paid for at the rate of $5 per 1,000. Aluminum tubes used for color films and Memo cartridges will be paid for at the rate of $10 per 1,000. Spools and tubes should be returned in minimum shipments of 40 pounds, freight collect, to the Ansco Camera Plant, Emma Street, Binghamton, N. Y. Packages should be labelled to show the contents.

Naval Research Lab Notes

A high speed oscilloscope recently developed by the Naval Research Laboratory is expected to prove invaluable for research in the field of microtiming. The equipment employs a hydrogen thyratron for the generation of sweep rates as high as 200 inches per microsecond, a speed which, if maintained by

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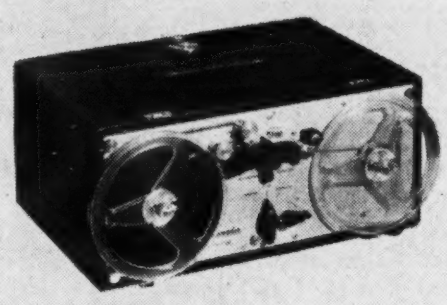

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In rack or console, or in its really *portable* cases, the Magnecorder will suit every purpose. PT6 Series shown is the most widely used professional tape recorder in the world, and is available with 3 speeds (3¾", 7½", 15") if preferred.

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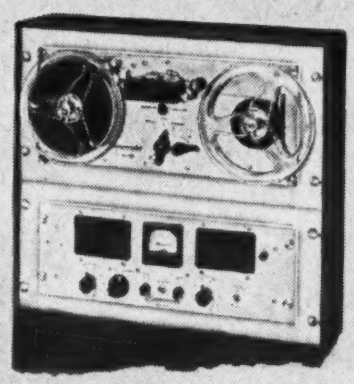
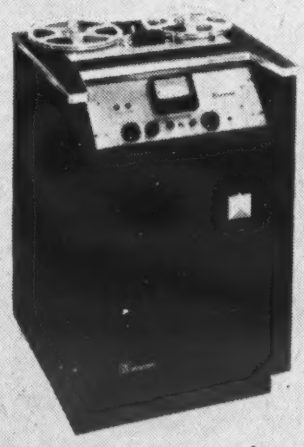
Lifelike tone quality, low distortion meet N.A.B. standards — and at a moderate price! PT63 Series shown in rack mount also offers three heads to erase, record, and play back to monitor from the tape while recording.





FEATURES

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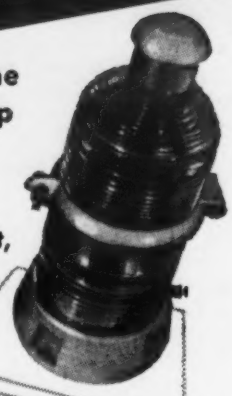

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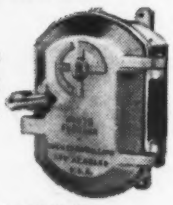

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aircraft, would take one from New York to Chicago in one-third of a second.

New Soundproofing

At the Naval Acoustical Laboratory, Annapolis, a new wrinkle in soundproofing has produced what is said to be the most sensitive sound-free room ever built. Fiber glass with glass cloth cover arranged in accordion-like folds makes it possible to study sound ranging from 60 to 8,000 cycles per second. The new insulation method is so effective that tests in one room in no way interfere with work going on in two or more adjacent similar rooms. In constructing the sound-proof room engineers literally turned the building inside out. All structural framework is outside the building, interior walls are perfectly flat, and the roof is suspended from beams.

AFCA Group Member Personnel News

Radiomarine Corp. of America: George P. Aldridge named vice president in charge of sales and government contracts. In the marine radio field since 1946, Aldridge served overseas with the Signal Corps in WW I in the rank of captain.

Capt. George F. Shecklen, USNR, executive vice president, was recently awarded the Marconi Memorial Medal of Achievement at the Veteran Wireless Operators Assoc.

Bendix Radio Division, Bendix Aviation Corp.: Edward K. Foster, general manager of Bendix radio, elected vice president and member of the executive committee of Bendix Aviation. Harold W. Giesecke, assistant to general mgr.; Lester F. Graffis, appointed chief field engineer, Bendix Radio. Wilmer T. Spicer named chief engineer of maintenance services. Following appointments recently made: Henry B. Yarbrough, mgr. of Air Force sales; J. Walton Colvin, assistant mgr. Air Force sales; Arthur B. Gittelman, mgr. of Navy and Signal Corps sales; Thomas J. Fleming, assistant director of purchases; Thomas M. Murphy, plant engineer; J. Russell Sandstrom, assistant plant engineer; Robert E. Wine, mgr. of subcontracting; George A. Engelbert, section chief, technical publications.

Western Union Telegraph Co.: Ronald G. Egan appointed executive representative in Europe, with headquarters in London. Egan is son of late President Joseph L. Egan.

Gray Manufacturing Company: Harry W. Stewart named commercial manager.

Sperry Gyroscope Company: J. L. Hammond, appointed director of field service engineering. G. M. Rouzee succeeds Hammond as manager for Navy contracts.

Link Radio Corp.: James M. Krumm appointed regional sales mgr., Washington, D. C., and surrounding area.

Westinghouse Electric Corp.: Samuel G. Hibben, director of applied lighting, has been elected president of the Illuminating Engineering Society.

Breeze Corporations, Inc.: Edward A. Sprigg of the engineering technical staff has been elected chairman of the newly organized Manufacturers Advisory Committee which will work with the Research and Development Board on electro-mechanical devices. The advisory committee was set up at a joint meeting of industry representatives and R&D Board's electro-mechanical devices sub-panel to help speed development programs now under way and aid in the formulation of future programs.

Colonel Elton F. Hammond, who succeeded Major General George I. Back as signal officer of the Far East Command upon Gen. Back's elevation to the post of Chief Signal Officer of the Army.

Radiomarine's 1250th Ship Radar

The 1250th postwar commercial shipboard radar manufactured by the Radiomarine Corporation of America has been installed on board the American Export Line's new 29,500-ton ocean passenger liner. The 1250 installations made by Radiomarine since 1947 include those on foreign flag vessels of 25 maritime nations as well as American merchant marine passenger and major cargo vessels.

New Plane Intercom System

With the designing performed by the RCA Laboratories and the electronics Laboratory of the Air Force Materiel Command at the Wright-Patterson Air Force Base, a new concept in intraplane communication which reduces voice distortion and instability has been achieved and will replace eventually all radiocommunications sets now in use on bombers, fighters, and transports.

All the audio components of an aircraft comunication system have been redesigned into one coordinated project and small amplifiers for crew members of a plane are most useful as a preamplifier for the crew members and as a booster for earphones instead of the one large central amplifier now being used.

MATS Marks 3rd Anniversary

The third anniversary of the creation of the Military Air Transport Service was celebrated at Andrews Air Force Base, Washington, D. C., June 1, with a two-day program of events. The general public was invited in for the sec-

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Lanahan With Eisenhower Again

Major General Francis H. Lanahan, commanding general of the Signal Corps' principal installation at Fort Monmouth, N. J., for the last four years, and a highly popular AFCA figure because of his constant and helpful activities in association affairs, including hosting two AFCA national meetings at Monmouth, left the U. S. in late April to take up duties with General Eisenhower at Supreme Headquarters of the Allied Powers in Europe.

Gen. Lanahan, it is definitely assumed, will become the chief signal officer in charge of all communications for SHAPE, the same World War II assignment which he held under Gen. Eisenhower in SHAEF. There has been no announcement on this assignment for Gen. Lanahan, but it is known that Gen. Eisenhower holds a high regard for his capabilities, and it is held to be significant that Gen. Eisenhower recently requested Gn. Lanahan to visit SHAPE to become familiar with the communications requirements and services of that headquarters.

During his four years of commanding the Signal Corps' most important field establishment, and by far its largest training center, Gen. Lanahan brought to the officers and troops of that post a high status of morale. His abilities of leadership were also felt to have achieved one of the highest levels of military training and discipline among Signal Corps troops in its history.

The Lanahans sail for Europe where Gen. Lanahan has been assigned at SHAPE. L to R: Mrs. Lanahan, sons Frank and Michael, Maj. Gen. Francis H. Lanahan, and daughter Ann who holds leash to dog "8 Ball." Miss Lanahan did not make the trip, but was to join the family after completing this year's school term.

NEWS

ond day showing of aircraft and AACS communications equipment.

AACSmen Combat Awards

AACSmen are continuing to earn awards and decorations for exceptional service in the Korean conflict. Fifty-eight such awards have been received from FEAF and the 5th Air Force. Forty were made by the 5th, and the bulk of these went to members of the AACS squadron which mans communications and navigational facilities in Korea. These men are becoming adept at quickly activating facilities at newly captured airfields, and at pulling out at the last possible moment when the tide of battle shifts.

GCA Unit Breaks Record

Old '27 (Kelly Air Force Base GCA Unit) with over 10,400 hours of hard operation behind her wave-guide, went whole hog recently breaking three separate records and winning letters of commendation for her troops and herself.

Col. James L. Jackson, director of maintenance at Kelly AF Base, personally flight-checked the radar-landing device. The check revealel that although the unit operated more than 10,000 hours it was in top shape. At this point GCA operators saw the possibility of some record-breaking. They were given the "Go-Ahead" by Colonel Jackson to continue operation through March.

The first record toppled at 10:30 a.m. on the 20th. Various types of aircraft were contacted and directed by GCA around a standard pattern to the end of the runway at the rate of one approach every two minutes. This "Rapid Transit" method was maintained here, utilizing vicinity aircraft with no scheduled assistance. The planes were picked up by radar from different positions and fed into the final controller's scope for direction to the end of the runway.

Maj. Gen. Clements McMullen, commanding the San Antonio Air Materiel area, flew GCA's 1,000th approach. By midnight the 31st, over 1,500 GCA approaches had been made, breaking a two-year U. S. record.

The final record was assured by noon on March 30. GCA approaches had by then totaled well over 1,450 and still going strong, with the U. S. record already badly beaten!

Armed Forces Contract Awards

An $8.5 million contract for the production of radar equipment for the Navy has been awarded *Westinghouse Electric Corp.* The contract is for search-type radar sets designed by Westinghouse electronics engineers working in cooperation with Navy experts.

The Civil Aeronautics Administration has increased its order for airport surveillance radar and precision approach radar systems to include five additional ASR and one additional PAR system, from *Bendix Radio Division.* This brings the total number of Bendix ASR systems ordered by the CAA to nineteen and teh total number of PAR systems to fifteen.

A contract for Zero Reader flight instruments for F-95A fighters has been placed with *Sperry Gyroscope Co.* by North American Aviation, Inc. They will be installed in the new all-weather version of the Sabre fighter, fastest U.S. service aircraft. Purchase of the all-weather flight indicator for the F-95A is the first military production order for the device.

Procurement Agency Moves

The Signal Corps Procurement Agency in Phalidelphia has moved to a new address, 225 South 18th St., Philadelphia 3, Pa. The agency's New York regional office also has moved, to 180 Varick St., New York 14, N. Y.

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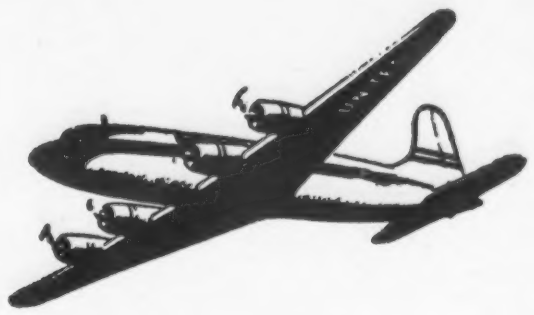
Bahry Goes To Boston NSY

After just short of four years' duty with the electronics division of the Navy Bureau of Ships, Lt. Cmdr. Frank Bahry has been reassigned to the Boston Naval Shipyards where he will be assistant to the electronics officer. He reported for duty on his new assignment 20 June 1951.

Cmdr. Bahry staged the excellent Navy displays at the Naval Research



25TH ANNIVERSARY

This year United Air Lines will celebrate its 25th Anniversary as the nation's oldest commercial airline. Since its inception in 1926, United has advanced at a pace unmatched in transportation history.

Always ready to adopt new ways of improving its services, United was the first commercial airline to use facsimile in connection with its weather flight forecasting.

Using equipment of the latest type manufactured by Times Facsimile Corporation, United is receiving weather information on a round-the-clock schedule to help in the safe routing of flights to all parts of the United States.

Times Facsimile Corporation wishes to take this opportunity to extend its heartiest congratulations to United Air Lines on the occasion of its 25th Anniversary and to express the hope that United will continue to provide the public with the excellent service that has marked their past quarter-century of operation.

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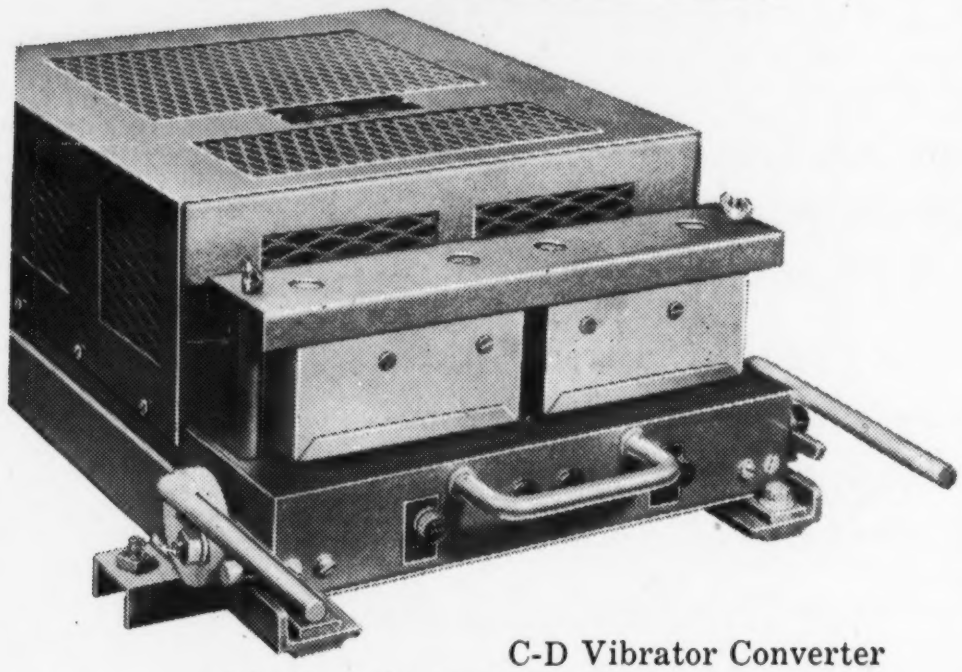
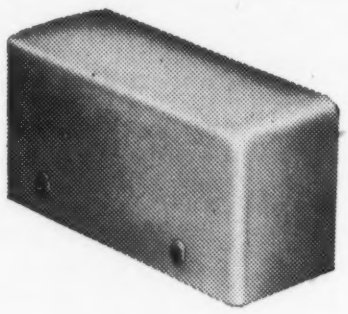


C-D Vibrator Converter with the exclusive double vibrator automatic self-service feature. Developed by C-D engineers for the major railroads; can be applied wherever continuous duty is a "must."



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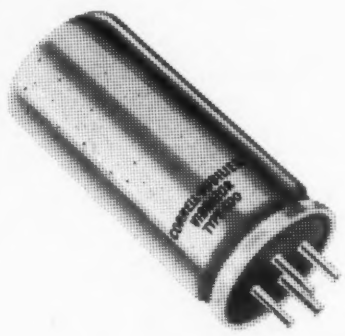

24-volt, 115 cycle synchronous C-D Vibrator, built to military specifications.

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NEWS

Laboratory for the AFCA's 1949 national meeting in Washington, D. C., when the Navy was the host service to the association convention. The Navy exhibits at the 1950 and 1951 I.R.E. shows in New York were also staged under the direction of Cmdr. Bahry.

During his tour of duty at BuShips, Cmdr. Bahry served as coordinator for the development of the latest electronic equipment applicable to Naval vessels, in the ship improvement program, and he was responsible for the establishment of the programming and estimating branch of BuShip's electronics division. His assignment there extended from 1 July 1947 to 5 June 1951.

Magnets Using No Critical Material

The development of new permanent magnets containing only non-critical material for applications in radio and television receivers as well as other commercial and military equipment have been announced by the metallurgical laboratories of Sylvania Electric Products, Inc.

Previous attempts to conserve cobalt have resulted in increased use of nickel or other critical materials, as for example, when electromagnets are substituted for the permanent magnets and additional copper is required for the windings.

Pictorial Art Aids USAF Cataloging

Pictorial art has become an integral feature in the Air Force catalog and coordinating office, supply division of the Air Materiel Command at Wright-Patterson AFB, in speeding up the Air Force portion of cataloging approximately 3 million items in the Federal supply catalog system.

Describing the advantages of the application of pictorial art in the cataloging system, Col. William M. Miles, chief of the catalog and coordinating office, pointed out that the statement "it is easier to see than think," meaning that with the majority of people the visual impression is the strongest, expresses well the argument for the need of the pictorial form in cataloging. Illustrations and drawings constitute a powerful visual tool for computation, analysis of engineering data, and the presentation of supply item descriptions.

Automatic Battery Tester

A tester which gives an instant check on a storage battery's condition, knowledge of which is vital for proper automobile and communications equipment performance, has been developed by the Signal Corps Engineering Laboratories, Ft. Monmouth, N. J.

Heart of the tester is a specially designed indicator. When used with vehicles the indicator can be easily adapted for mounting on the dashboard or steering wheel column and tell the driver if there is enough juice in the battery to start the engine. In central depots the new tester will be able to test hundreds of batteries in a fraction of the time needed for ordinary testers, thus saving countless man hours needed elsewhere on the fighting front.

Brainchild of Grenville B. Ellis, chief of the power sources branch, the new tester, only one of its kind in existence, combines many separate functions performed by other testers. In automatically registering the battery's health the new tester reveals the amount of charge, at what temperature the battery will freeze, whether it is getting too much charge from the generator, and whether an extra load, such as produced by a car's radio, heater, headlights, cigarette lighter or clock, is dragging strength below the danger point.

Knowing whether a battery is receiving too much current from the generator is highly important in getting

Newest advance in railroading...

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Erie Railroad's *Main Line*—85% of it—is now equipped with *Farnsworth* radio. In clear or foul weather, orders and information can be transmitted—linking cab and caboose...moving trains...dispatchers...wayside stations...even crewmen on foot. This is the most extensive and comprehensive main line radio-telephone communication system ever installed. Soon its coverage will be complete—providing full radio communication between trains and 59 wayside stations, New York to Chicago. 204 mobile units are already in service; 68 more are in process of installation—in addition to 55 mobile and 6 base stations in yard and terminal service. All equipment was engineered and manufactured by an associate of International Telephone and Telegraph Corporation. Comprehensive, practical, fully-proven radio systems are now available to meet the exacting requirements of America's railroads.

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For information on "*Farnsworth*" railway radio communications, address *Federal Telephone & Radio Corporation*, Clifton, N.J.

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NEWS

the greatest possible length of service from the battery, Mr. Ellis points out. "The thing that ruins most batteries," he emphasizes, "is being overcharged to death."

The new tester makes it unnecessary to unscrew the battery cell caps and gives an electrical rather than a chemical test. Two prods are pressed against the battery terminals and the desired information is automatically relayed to the indicator.

Electronic Gunsight Effective

An electronic, triple-threat computing gunsight manufactured by Sperry Gyroscope Company, combined with Republic's F-84E Thunderjet and the skill of pilots of the 27th Fighter-Escort Wing, are recognized as a winning trio in the Far East Theater of operations.

Success of the Sperry sight, which met its first combat commitment with the entry of the Thunderjets into the Korean war, is revealed in a report by the 27th Wing to the sight's manufacturers. The report calls the sight, airplane, and fighter wing a "threesome unmatched." The Sperry equipment was initially developed by Dr. Stark Draper of the Massachusetts Institute of Technology under sponsorship of the Air Materiel Command.

NRL On Radiation Fluctuations

Optical communication in ultraviolet, visible and near-infrered spectrum areas is affected by incident radiation fluctuations produced by atmospheric turbulence (twinkle), as well as reflections from water, reports a recent finding of the Naval Research Laboratory (ONR) in a program of investigation and measurement of such limitations. Using an electronic-optical receiver of a low-frequency nature to pick up electrical noise produced by radiation fluctuations, it was found that RMS amplitude of this noise in a narrow band decreased with increasing frequency.

Mandelbaum Awarded DSM

The distinguished Service Medal was recently awarded to Colonel Albert J. Mandelbaum for "exceptionally meritorious" wartime service as head of Air Force communications in the CBI Theater. Lt. Gen. T. B. Larkin, assistant chief of staff, G-4, made the presentation.

Among those present at the ceremony in Gen. Larkin's office were Brig. Gen. Ivan L. Farman, now Air Force deputy director of communications, who was commanding general of the Army Airways Communications System when Col. Mandelbaum commanded the Asiatic airways communications area; and Brig. Gen. Wesley T. Guest, chief of signal plans and operations division, OCSigo, and formerly chief of the Army communications service division.

Currently assigned as chief of the materials and products section, production branch, procurement division, G-4, Col. Mandelbaum was previously chief of the personnel and training division, OCSigO, and before that headed the Signal Corps Publications Agency at Ft. Monmouth, N. J.

Golay Wins Award

Dr. Marcel Golay, a chief scientist of the Signal Corps Engineering Laboratories, Ft. Monmouth, N. J., was presented the Harry Diamond Memorial Award for outstanding publications contributions in the fields of radio and electronics at the annual convention of the IRE. (Dr. Golay authored an article, "Philosophy of Communication," in the Nov-Dec 1950 issue of SIGNAL).

The award, named after a former National Bureau of Standards scientist, is presented annually in recognition of publication in professional journals. It was presented to Dr. Golay by I. S. Coggeshall, IRE president and general traffic manager for the Western Union Telegraph Co.

(*Continued on page* 71)

How to command a better job in
COMMUNICATIONS—
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No man—no matter how well-informed—can afford to let his technical knowledge become obsolete, particularly in such a fast-moving field as *Electronics*. Today, when opportunities for profitable, interesting employment are far more extensive than the available supply of skilled technicians, *training* is more important than ever.
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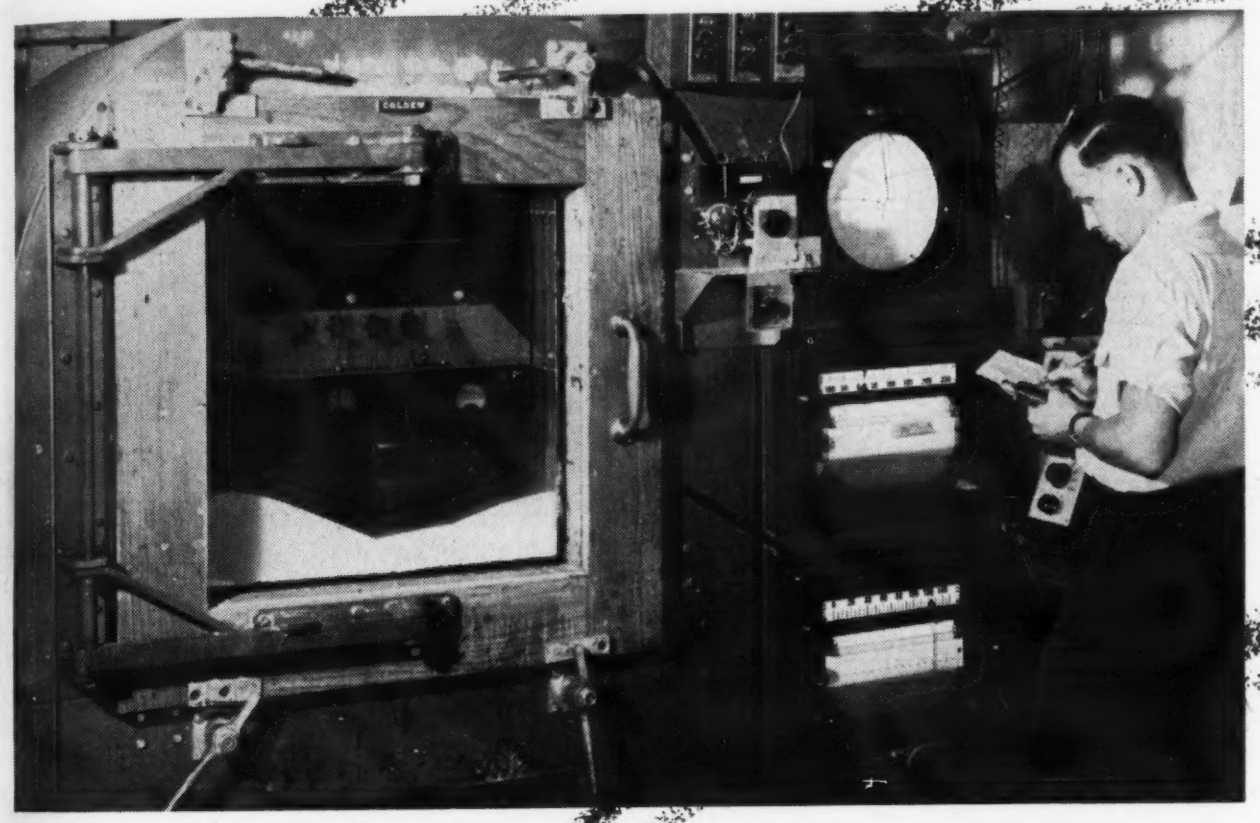

Everyday, research and design engineers at Hoffman Radio Corporation "take" electronic equipment up into the upper atmosphere for extensive testing and observation. The special test chamber pictured above will duplicate extremes in altitude, temperature and humidity... automatically record the conditions of the test... all at the touch of a few dials and controls.

Complete testing under actual operational conditions is one of the many reasons Hoffman-built electronic equipment has been so readily accepted by the Military services, Government departments and the general public.

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Philadelphia SCProcA Employee Composes Signal Corps Song

"Get the Message Thru"

A new Signal Corps marching song, titled "Get The Message Thru," was recently presented to the Corps by the song's composer, Ted Di Renzo, an industrialist specialist at the Signal Corps Procurement Agency, Philadelphia, and a member of the AFCA. The song is reproduced on this page by permission of the copyrighter, Mr. Di Renzo. A prayer included in the complete arrangement is not shown here.

Ted Di Renzo, composer of new marching song and prayer, "Get The Message Thru," which has been presented to the Signal Corps, shows artwork for cover of song publication to Colonel W. D. Dillinger, commanding officer of the Signal Corps Procurement Agency at Philadelphia where Di Renzo is an employee.

"GET THE MESSAGE THRU" (MOTTO OF THE SIGNAL CORPS)

WORDS AND MUSIC BY TED DI RENZO

MARCH TIME

1. FROM THE WIG-WAG FLAG AND SEM-A-PHORE CALL-ING TO A FAR OFF
2. TO CO-OR-DI-NATE OUR FIGHT-ING MEN IN THE HAIL OF FLY-ING
3. IT'S THE FLASH GUN GUYS WITH CAM'RA KITS SHOOT-ING PIC-TURES BY THE

SHORE, TO A RA-DAR SET AND MI-CRO-PHONE IT'S THE AR-MY
SHELL, WE COM-MUN-I-CATE WITH SCOUTS A-HEAD IN SPITE OF
SCORE, MAK-ING HIS-TOR-Y PHO-TOG-RA-PHY FOR THE AR-MY

SIG-NAL CORPS. AL-WAYS FAITH-FUL EV-ER READ-Y
STRAF-ING HELL. HAND-IE TALK-IE RA-DI-O AND
SIG-NAL CORPS. DOTS AND DASH-ES CODES AND FLASH-ES

STRIV-ING TO BE TRUE, FOR THE MOT-TO OF THE SIG-NAL
FLY-ING PI-GEONS TOO, FOR THE DU-TY OF THE SIG-NAL
TELL-ING WHAT TO DO, FOR THE MOT-TO OF THE SIG-NAL

CORPS IS "GET THE MESS-AGE THRU!"
CORPS IS "GET THE MESS-AGE THRU!"
CORPS IS "GET THE MESS-AGE THRU!"

—COPYRIGHT 1951 BY TED DI RENZO—
1906 S. JESSUP ST. PHILA., 48, PA..

Combining music and Signal Corps work is not new for Di Renzo. For three years during World War II he served with the Signal Corps as an entertainment director, during which time he produced several service shows. Enlisting in 1943 he was stationed at Camp Crowder for his first year, after which he saw service in New Guinea, the Philippines, and finally in Japan with the 8th Army.

Before the war Di Renzo was in the production control department of the RCA Victor Corp., at Camden, N. J., where his father was also employed. During his enlisted reserve period, upon entering the service, he continued work at RCA Victor and at the same time undertook an evening course at night school where he completed a highspeed telegraphic course, earning a certificate thereby. After separation from service in 1946 he returned to RCA Victor and left the company again in 1947 to complete his college training at Temple University, where he earned a B.A. degree.

The Temple University band, under the direction of John Jenny, with the Temple male chorus recently recorded Di Renzo's "Get The Message Thru." The song was orchestrated by Frank Hundtermark, who under the name of Frank Hunter has arranged for three consecutive years the West Point annual show, and also arranges for the Sammy Kaye and Elliott Lawrence orchestras.

Mr. Di Renzo has made available piano copies or band arangements of his Signal Corps marching song to AFCA members on request. He would appreciate comments on the song.

Army combat photographer Captain Robert L. Strickland shows combat camera he used in Korea to Defense Department reporter on recent TV program. Strickland was awarded the Silver Star Medal last fall for "outstanding bravery while photographing the assault for the objective of Seoul."

Mr. Coggeshall was himself honored, June 17, when he was awarded the honorary degree of Doctor of Engineering by Worcester Polytechnic Institute at the Massachusetts school's commencement exercises. Mr. Coggeshall started his communications career in 1911 as a "ham." For the past 14 years he has specialized on ocean cables. He was on active duty with the Navy in both World Wars.

Signal Corps Assignments

Upon completion of the course at the Armed Forces Staff College, Norfolk, Va., assignments on or about June 30 as indicated: Lt. Col. George W. Rhyne, Signal Corps Photographic Center, Long Island City, N. Y.; Lt. Col. David R. Guy, Signal Corps Center, Ft. Monmouth, N. J.; Lt. Col. Harold McD. Brown, Munitions; Lt. Col. George E. Pickett, office of the assistant chief of staff, G-4.

OCSigO

Lt. Col. Charles M. Woodman and Major Edward L. Nielsen to military training branch, personnel and training division OCSigO. (Col. Woodman was recalled to active duty from Dallas, Texas. Major Nielsen was formerly chief of the Military Amateur Radio System, Army.) Capt. Herbert Lott and Capt. Arthur O'Neil, reservists recalled to active duty, to Army communications service division. Lt. Col. Charles T. Clark to personnel and training division; Major Otis A. Davis, Sr., to signal plans and operations division. Recalled reservists Major John E. O'Hanlon to operations and planning branch of plans and operations division; and Capt. Louis F. Rudulph, Jr., to Army communications service division.

Col. Allen G. Swede, AT&T Co. staff engineer under assistant vice president T. E. Berrier in Washington, completed June 18 a 15-day tour of reserve duty with the comptroller division.

Capt. John Brinda, Jr. and Lt. David W. Pettigrew, 14-day active duty tour with Army communications service division. Major John J. Doran, 15 days active duty with legal division; Capt. Herbert H. Gibson, 14 days active duty in signal plans and operations.

Major Warren S. Hatfield to personnel and training division; Capts. Charles Sovern and Leonard C. Briggs to Army communications service division.

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	U.S.A. 57-0-2, Type II, Class B U.S.A. 51-70-1, Finish 22.02, Class B	*"PERMADINE"*
	U.S.A. 57-0-2, Type II, Class A U.S.A. 51-70-1, Finish 22.02, Class A	*"THERMOIL-GRANODINE"*
ALUMINUM	MIL-C-5541 MIL-S-5002 AN-F-20 U.S. Navord O.S. 675 16E4 (Ships)	*"ALODINE"*
ZINC	QQ-P-416 RR-C-82 JAN-F-495 AN-F-20 U.S.N. Appendix 6	*"LITHOFORM"*

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"PERMADINE" forms an oil-adsorptive zinc phosphate coating on steel, which, when treated with rust inhibiting oil, is highly corrosion resistant.

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"ALODINE", the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal painted or unpainted.

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Send part (up to ¼" dia. and to 1½" length) and your specs for a quotation or write for DATA BULLETIN.

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88 Mountain Grove St., Bridgeport 5, Conn.

Manufacturers of BEAD CHAIN — the kinkless chain of a thousand uses, for pull and retaining chains and other industrial uses; plumbing, electrical, jewelry, fishing tackle and novelty products.

Outstanding educators recently met with Signal Corps officials in the Pentagon to discuss progress of the Signal Corps post-war training program in civilian educational and industrial institutions. L to R, above, the members of the panel are Dr. William Everitt, dean of the college of engineering, University of Illinois; Colonel Arthur Pulsifer, chief of personnel and training division, OCSigO; Brigadier General Wesley T. Guest, chief of signal plans and operations division, OCSigO; Dr. Frederick E. Terman, dean of the school of engineering, Stanford University; and Dr. George R. Harrison, dean of science, Massachusetts Institute of Technology. The educators noted that considerable progress had been made in the training program and recommended only minor changes to improve it still further.

NEWS

Waters Decorated

Lt. Col. Richard W. Waters has been awarded the Bronze Star Medal for meritorious service in connection with operations against an enemy of the U. S.

Mulally NPA Copper Deputy

Joseph W. Mulally, on leave from his position as manager of utility sales for the Anaconda Wire and Cable Co., has been appointed deputy director of the NPA's Copper Division. Mr. Mulally, who will assist Acting Director Frank

The War's Toughest Assignment

(*Continued from page* 33)

super-star. I quickened my pace—no use shooting it down and letting it fall on the island.

I had just started explaining the situation to the Old Man when the phone rang for me and I received the reports earlier requested. "OK, thanks very much—stand by for orders," I said and hung up.

"Sir," I said, "the situation stands very much as I've told you, except. . . ."

"Have you picked it up on the radar?" he interrupted.

"No sir, but. . . ."

"Never mind the 'buts'—I know the stuff's erratic. How about the optical range finders? That's got to work, since you can see the balloon—or does it?" he added, sarcastically.

"Sir," I replied, "according to the optical data the target is at infinity. Something seems wrong!"

"Oh hell—these new gadgets are all alike, when you really need 'em, you can't trust them. Let's go out where I can see for myself," and briskly he stepped outside. I followed, admittedly perplexed.

It was a warm tropical night. Every star in the sky was beaming and a crescent moon showed through the palm fronds just below where the searchlights held the luminous sphere. I pointed it out to the C.O. It hadn't moved much.

"I don't even need my glasses on this problem," mumbled the Old Man, and stepped hurriedly back into the Quonset hut and picked up the phone and asked for the flight operations officer.

"Get two fighters into the air immediately and shoot down that damn balloon before it gets over the island," he ordered, and hung up.

We both again stepped outside to watch the show.

Minutes later the roar of motors broke the stillness of the tropical night as two aircraft rose and streaked into the star-studded sky.

Expectantly we waited for the sharp bark of the machine guns and the flame-cloud which would follow when the hydrogen-filled bag was hit by incendiaries.

We waited a long time. . . .!

* * * *

Perhaps in some later year when man travels to other planets, a yarn can be spilled to the Venetians indicating how in an earth-war an order was once given that their planet be shot down—with 50-calibre machine guns, no less. That beautiful celestial orb Venus, which at times is more brilliant than any fixed star, was mistaken for an explosive-laden Japanese balloon.

The next day in the officers' club I met one of the fighter pilots, who jokingly said he didn't get suspicious until he passed the moon; but seriously asked whether I didn't think the job given him last night should be rated the war's toughest assignment.

I was inclined to agree.

• • • — • —

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50 kc 2nd I-F GIVES MORE OF WHAT YOU WANT THAN ANY OTHER SET ON THE MARKET REGARDLESS OF ITS PRICE CLASS

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GIANT 4-IN "S" METER calibrated in microvolts and "S" units. Four bands 538—1580 kc, 1720 kc to 32 Mc. Calibrated electrical bandspread, 5 position selectivity, average sensitivity 2 microvolts with ½ watt output. 9 tubes plus regulator, rectifier . . .

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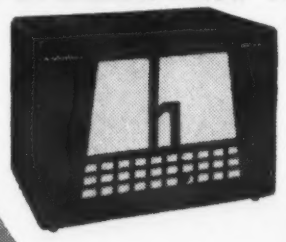

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H. Hayes, was chief of the wire and cable branch of the copper division, War Production Board, during World War II.

New Signal Corps Facsimile

Signal Corps engineers are developing facsimile equipments which can provide small front-line photos of newspaper quality anywhere in the world within five minutes after the picture is taken.

The new equipments, designed to surpas sanything now in use, will send pictures and maps faster, accept larger copy size, and give clearer images on the receiving end of the line. In addition, the information—both words and graphic material—can be automatically reproduced on a mimeograph stencil, making hundreds of copies available within moments.

To use all possible communications corcuits to the greatest advantage, the new facsimile equipment wil operate at three different speeds. Only one speed is available with present equipment. When used with poor radio circuits, the machines will scan the copy at 45 lines per minute; for average circuits, the rate will be 90 lines; and for better than average circuits the speed will be increased to 180 lines. This versatility will permit the new machine, under best conditions, to send material twice as fast as now possible.

Still in the planning and investigation stages are facsimile equipments which will cut down transmission time to seven seconds; sets which accommodate copy 32x40 inches, or larger than a double page newspaper spread; electronic methods of scanning continuous record of copy; and devices which will measure and correct military and commercial facsimile network characteristics quickly and simply.

Signal Corps Film Wins Award

"The First Forty Days," Signal Corps film, has been cited as the best television documentary of the 1950 radio-television season by TV-Radio Life magazine of Los Angeles, Calif.

The publication's distinguished achievement award was presented to the Signal Corps at a meeting of the Hollywood Advertising Club, where Lt. Mervin W. Arps, Jr., Signal Corps pictorial officer, acepted the award for the Signal Corps. Executives of advertising agencies as well as advertising executives of radio, television, and press attended the meeting.

The film consists of combat footage taken during the first 40 days of military operations in Korea. It was processed, edited and narrated at the Signal Corps photographic center, Long Island, N. Y., and then made available for release to the general public for non-profit motion picture and television exhibit.

Company "B" 35th Reunion

Field Company "B" of the California NG Signal Corps gather in San Francisco in mid-June for a reunion dinner marking the 35th anniversary of their mobilization for Mexican Border service, June 1916.

One of the members of the company, Tom Dooling, has maintained a roster of the group as complete as possible. Of the original 77 he has located 50, has learned that 19 are deceased, and has the remaining 8 unaccounted for. Anyone who may have information concerning old Company "B" members is requested to communicate with Tom Dooling, c/o Electric Storage Battery Co., 6150 Third St., San Francisco 24, Calif.

Air Force Network Opened

The Air Force has opened its new nation-wide, push-button, high-speed telegraphic communications network linking 179 stations in the United States. The system was designed and provided by the Western Union Telegraph Company after 15 years of research.

Lavoie

(*Continued from page* 26)

tion of two numbers are required.

As a corollary to the work being done in frequency measurements, Lavoie Laboratories is also manufacturing crystal impedance meters. These instruments are used for the measurement of the characteristics of quartz crystals, as they pertain to frequency control. Hundreds of these compact test sets are in use in industry on government contracts, and a continuing demand confirms their reliability and usefulness. Two models, the Model 50 and the Model 51, cover the frequency range of from 75 to 1100 kilocycles and .82 to 15 megacycles respectively.

Other equipment manufactured includes pulse generators, harmonic frequency generators (for the calibration of wavemeters), radar search and beacon equipment, communications systems, antennas, electromechanical assemblies, and electromedical instruments.

• • • — • —

This Is Bendix Radio

(*Continued from page* 39)

facturers to deliver parts and tubes and it appears evident that the production of television receivers will be curtailed.

An organization is only as great as its people. Bendix Radio includes in its personnel roster many names that are associated with lasting contributions to the electronics art. Space limitations prohibit mentioning all of the people who have played a part in building and maintaining the Bendix reputation. At the helm is Edward K. Foster as general manager. The sales activities of the Bendix Radio Communications Division are under the guidance of Arnold Rosenberg, general sales manager and Robert B. Moon, assistant general sales manager. General factory manager, Edward F. Kolar is responsible for all manufacturing operations.

Long a well-known name in the engineering field, Wilbur L. Webb directs all engineering and research activities with the aid of Arthur C. Omberg, assistant director of research and engineering. The chief engineers who head the six engineering groups include A. E. Abel, radar engineering, R. K. Frazier, communication and navigation engineering, D. M. Heller, commercial product engineering, J. Miller, television and broadcast receiver engineering, W. T. Spicer, maintenance services and Dr. W. R. Hedeman, Jr. who directs the research organization. Howard Walker is executive engineer, George Faustman chief industrial engineer and L. F. Graffis is chief field engineer.

General offices for the Bendix Television and Radio Division are also located in the Towson plant. W. A. Mara, general manager of the TV division is also director of public relations for all divisions of Bendix Aviation Corporation. Television sales are under the direction of R. W. Fordyce, general sales manager and W. P. Muller heads the TV service department.

Color television which created a furor late in 1950 is not new to Bendix Radio. One of the original color television receivers used in early demonstrations of the CBS color television system was designed and built in the research laboratory of Bendix Radio. This grand-daddy of color television receivers, now a museum piece, is a vivid example of Bendix leadership in the field of electronics.

To maintain leadership, the 3,500 engineers and scientists at the ten research laboratories of the entire Bendix Aviation Corporation are constantly at work exploring new phenomena and developing new equipment and techniques. From the laboratories of Bendix Radio Division innovations in communications, navigational aids and electronic control are forthcoming. New talent is being recruited to augment and variegate the broad collective experience of the engineering and research departments. Quality is always stressed because strict adherence to highest standards of quality not only results in greater customer satisfaction but better morale through the satisfaction that can only be attained from a job well done.

• • • — • —

"Live artist" quality is a characteristic of the new RCA Victor "Personal" radio, one of the most compact ever built.

How to hold a band in your hand!

Tune in this RCA Victor "Personal" radio—no bigger than a book. Out pour the full tones of any orchestra—so full of "living presence"—that it's like holding a band in your hand.

This compact instrument grows directly from basic research conducted at RCA Laboratories. Scientists and engineers here perfected highly efficient circuits and electron tubes—powered by compact RCA Batteries. Its built-in antenna gives peak performance anywhere—at home or "on the road." Its miniature loudspeaker offers fine acoustical performance in a minimum of space.

Development of this handsome portable radio, weighing less than 4 pounds, is another example of RCA research and engineering at work for you. Result: a totally new satisfaction from a small "Personal" radio.

* * *

See the latest wonders of radio, television and electronics at RCA Exhibition Hall, 36 West 49th Street, N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, N. Y.

See the compact new RCA Victor "Personal" radio today. Model B411—now on display at your local RCA Victor dealer's.

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

NEWS

Mauer To Wright-Patterson

Colonel Milton G. Mauer, former president of the AFCA Sacramento Chapter, has been called to active duty and is presently on an assignment with the Air Materiel Command at Wright-Patterson AFB, Dayton, O.

Col. Mauer was called back to active service in March to activate and organize a newly authorized Air Force wing —the 2942 Depot Training Wing, at McClellan Air Force Base, Sacramento, California. He commanded the wing thereafter until reassigned to AMC Hq on 14 May.

Photo Lenses Standard Adopted

A photographic lenses standard has been adopted by the armed forces which establishes definitions, nomenclature, practices, threads, and tests for lenses. The Air Force, with custody of the standard, will in general draw up specifications for Army and Navy, and draft procurement documents. The standard also contains a list of references on general photographic optics and calibration of mapping camera lenses and complete cameras.

Copies of *Military Standard Photographic Lenses,* MIL-STD-150, are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 25c each.

Horne and Rentzel Praised

Highest commendation for the capabilities and knowledge of the aviation field, including lengthy expert experience in communications and electronics aviation aids, of Charles F. Horne and Deloz W. Rentzel in their new high government posts of Administrator of the Civil Aeronautics Administration and Under Secretary of Commerce for Transportation, respectively, was stressed by leading members of the Senate Interstate and Foreign Commerce Committee in the hearing on their confirmation April 4.

Captain Horne, an AFCA member (whose excellent address before the AFCA Boston Chapter was published as a feature piece in the Jan-Feb 1951 issue of SIGNAL) was given high praise for his abilities by Senator Ernest W. McFarland, majority leader.

New Photo Process Saves Water

A new photo processing method which completely eliminates the necessity for washing films and prints has been developed by the Signal Corps Engineering Laboratories at Ft. Monmouth, N. J. In practice it solves a major combat photography problem of securing adequate supplies of fresh water in battlefield areas.

Use of the process, known as stabilization, permits processing time to be cut to a minimum. By eliminating the necessity for washng, plus use of specially formulated Amidol developer, stop bath and stabilizer solutions, processing is about 10 times faster for films and about twice as fast for prints. In conventional processes, washing films ordinarily takes a half-hour, prints at least an hour.

The saving in water normally used for washing is tremendous. A single typical field photographic laboratory consumes about 3000 gallons of water each day.

Heart of the new stabilization process, which has been in the research stage for the past year and a half, is a stabilizing solution, thiourea. Average time for films and papers in this solution is two minutes.

So thoroughly are the negatives stabilized that extreme high temperatures and humidity do not impair the printing quality. Extnsive tests also disclose no fading of prints.

Water resistant photographic paper is used in the stabilization process, helping to cut down drying time by as much as 50 per cent. Special drying methods can also be used to reduce this time even further.

The process, which gives a medium fine grain development, can be used at different temperatures. Resulting tones are similar to those produced by ordinary developers.

Military Communications Leaders On European Inspection Trip

Top-level communications officers of the U. S. armed services, headed by Major General H. M. McClelland, director of communications-electronics of the Joint Chiefs of Staff, took off June 15 for Europe for an inspection of approximately two weeks' duration of the communications installations and systems of the U. S. Army, Navy, and Air Force in that theater.

In the group were Major General F. Ankenbrandt, Director of Air Force Communications; Rear Admiral John R. Redman, Director of Naval Communications; and Brigadier General V. A. Conrad, chief of the Army communications service division of the Signal Corps. Each of the armed services' communications chief officers has top assistants from his respective organization in the group. The inspection is slated to embrace the communications installations in the North Atlantic and at the Azores as well as in England and on the European continent.

Whither Are We Whencing?

(*Continued from page* 11)

European shore stations *even in daylight* almost all the time. The arc set is simplicity itself. It is as big as a 50-gallon oil drum and just about the same proportions. It's not a doggone thing except a huge electro-magnet operating on 500 volts DC. (The spark sets always work on AC because they use transformers.)

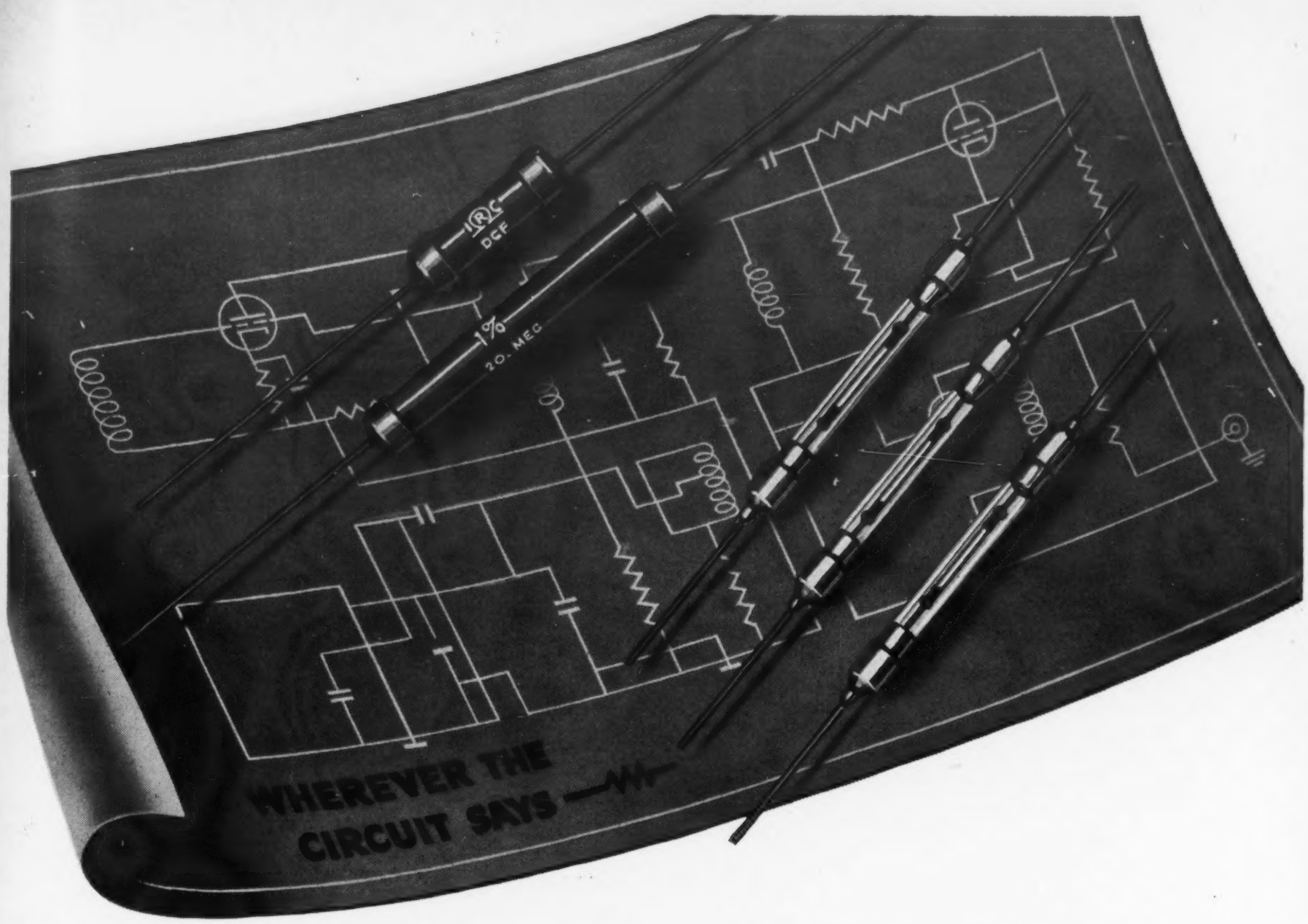
There's a chamber inside this electro-magnet right where the magnetic field is strongest and inside this chamber an arc burns all the time you're transmitting. The windings for the magnet are in series with the arc acting like a resistance to limit the load on the generator so, you can see, it's a very efficient set. One side of the arc is grounded while the other goes directly to the aerial through a turning coil. The arc always oscillates and puts out a signal. It is keyed in a very interesting fashion. Coupled closely to the big turning coil is a single turn of about No. 4 braided wire. It's called an "absorption loop." A relay (controlled by the key) shorts out this loop when the key is up. You see what happens? When the key is down the loop is opened and a signal goes out on one wave length. When the key is up, it goes out on another wavelength about a hundred meters or so away. Pretty clever, eh? This is necessary because the arc has to be "struck" and requires a little time to "build up" and burn steadily. You couldn't key it rapidly. So, we let it burn all the time and just de-tune it for keying. Of course when you're copying an arc you have to be sure you're on the keying signal, not the spacing signal. I made that mistake once when ringing up the time tick. The Skipper had apoplexy—thought his chronometer was 10 seconds fast.

To keep the arc burning steadily, pure grain alcohol drips into the chamber to maintain a gaseous condition. I understand that in the big Navy shore stations where they use arcs up to 300 KW they pipe city gas right into the chamber for the same purpose. They might as well use city gas here aboard ship for all I care. The alcohol they give us is spiked with red pepper and mustard.

I like this arc set fine. It puts out what we call an undamped wave which has no decrement. It doesn't make much noise but it sure creates a splash in the ether when I light it off and I can always raise the station I'm calling. I feel sorry for the "Leviathan." Western Electric installed a 20 KW transmitter using vacuum tubes—can you imagine that?—and they can't raise anyone. The set puts out too sharp a signal. Unless you're right on his wavelength you never hear him. We don't have that trouble with arcs, though. They always hear us. Normally we use the arc for calling on 2,100 meters* and

**Ibid.*

(*Continued on page* 80, *col.* 1)



RESISTANCE AS HIGH AS YOU NEED IT!

What's meant by "high resistance"? 200 ohms to 5 megohms? 500 ohms to 20 megohms? Or higher?

Whatever it is, the resistance *you* need in *your* high megohm applications probably falls within the scope of IRC Deposited Carbon PRECISTORS or new Type UHR Resistors.

New IRC Type UHR (Ultra High Resistance) Resistors actually provide resistance values of 10^8 to 10^{12} ohms inclusive! High resistance and small size make them suitable for use in such critical applications as atomic research instrumentation. Hermetically sealed in inert gas in glass tubes, the new UHR's are protected from mechanical damage and exposure to atmospheric conditions. Tolerances: ±10% standard, ±5% and labeled to within ±1% of actual value at additional cost

IRC Deposited Carbon PRECISTORS—within limits of 200 ohms to 5 megohms, and 500 ohms to 20 megohms—are manufactured to customers' exact specifications, rather than to standard RMA values. Above-standard ranges, of course, can be made to special order. Made of pure crystalline carbon bonded to selected ceramic cores, PRECISTORS are unusually well-suited to high frequency requirements, electronic computers, and as replacements in all kinds of test equipment. We recommend them particularly for circuits where carbon compositions are unsuitable and wire-wound precisions too expensive.

Send for free Technical Data Bulletins on these IRC Resistors—and be sure to ask about our Industrial Service Plan. It enables your IRC Distributor to give you prompt delivery of maintenance and experimental quantities—right from his local stocks. International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa. In Canada: International Resistance Co., Ltd., Toronto, Licensee.

Wherever the Circuit Says —WW—

Power Resistors • Voltmeter Multipliers
Insulated Composition Resistors
Low Wattage Wire Wounds • Controls
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Please send me additional information on items checked below:—

☐ Deposited Carbon PRECISTORS ☐ New UHR Resistors
☐ Name of local IRC Distributor

*Name*_____

*Title*_____

*Company*_____

*Address*_____

Books — and services — Frank Martins, Sig Sy.

A SOLDIER'S STORY. By Gen. Omar N. Bradley. Henry Holt & Company. 618 pages. $5.

Since its publication, General Bradley's story has stirred comment second only among war memoirs to Eisenhower's Crusade In Europe. And with good reason, for it is undoubtedly second only to Crusade in interest.

There has been expressed a variety of opinion about General Bradley's book, but on one point there is a complete unanimity of view, and that is on the story's high readability. Once you open the book you'll find it hard to lay it down until you have finished the last page.

Signalmen should appreciate Bradley's reference to their part in the war. Says he, ". . . orders were transmitted easily over the most valued accessory of all: the elaborate telephone system we carried with us into the field. . . . I was never more than 30 seconds by phone from any of the Armies. If necessary, I could have called every division on the line. Signal Corps officers like to remind us that 'although Congress can make a general, it takes communications to make him a commander." The maxim was never more brilliantly evidenced than in this battle for the Ardennes."

THE RED ARMY TODAY. By Col. Louis B. Ely, USA. The Military Service Publishing Co. 284 pages. $3.50.

The purpose of this book, says the author, is to give the reader a comprehensive picture of the Soviet Army, by far the largest armed force in the world today, and the most ominous threat to international tranquility.

Despite the iron curtain surrounding Soviet Russia and the neighboring states it dominates, a great many facts are known about the Red military force, and from them other facts may be deduced. An army of over two and a half million men cannot be concealed even by the secrecy of Soviet Russia.

The Red Army Today offers an accurate description of the Soviet military machine. These details are presented by the author so that the American in any walk of life, both serviceman and civilian, may better understand the quality and capacity of the military force in the hands of the rulers of the Soviet state.

National Best Sellers

Compild o a Percentage Basis from the Reports of 68 Booksellers as listed in Publishers' Weekly for June 9, 1951.

FICTION

1.	From Here to Eternity, *by James Jones*	$4.50
2.	Proud New Flags, *by F. van Wyck Mason*	$3.00
3.	The Caine Mutiny, *by Herman Wouk*	$3.95
4.	Return to Paradise, *by James A. Michener*	$3.50
5.	Joy Street, *by Frances Parkinson Keyes*	$3.00
6.	Festival, *by J. B. Priestley*	$3.95
7.	A Woman Called Fancy, *by Frank Yerby*	$3.00
8.	New York 22, *by Ilka Chase*	$3.00
9.	God's Men, *by Pearl S. Buck, John Day*	$3.50
10.	Old Herbaceous, *by Reginald Arkell*	$2.00

NON-FICTION

1.	Washington Confidential, *by Jack Lait and Mortimer Lee*	$3.00
2.	A King's Story, *by the Duke of Windsor*	$4.50
3.	Kon-Tiki, *by Thor Heyerdahl*	$4.00
4.	His Eye Is On The Sparrow, *by Ethel Waters and Charles Samuels*	$3.00
5.	Rommel the Desert Fox, *by Desmond Young*	$3.50
6.	The Riddle of MacArthur, *by John Gunther*	$2.75
7.	Better Homes & Gardens Garden Book	$3.95
8.	Out of This World, *by Lowell Thomas, Jr.*	$2.50
9.	Peace Can Be Won, *by Paul G. Hoffman*	$2.50
10.	My Six Convicts, *by Donald Powell Wilson*	$3.50

Soviet Military Organization

An excellent companion piece to *The Red Army Today* is a booklet on *The Soviet Military Organization* published by the Armed Forces Information School. Originally appearing as a series of articles in the *Army Information Digest*, the material attracted such wide interest that the Information School compiled and reprinted the articles in booklet form.

The booklet begins with a brief history of early Russian fighting forces, through the disrupting period of the Revolution, into the rise of the present Soviet army. The individual character of the Red soldier and his service and training are examined. Activities of armed partisans in World War II are reviewed, giving an insight into what might be expected of them in a future conflict on Soviet ground. Red leadership, and the structure of the high command is described.

The booklet sells at 50c. Copies may be obtained from the Book Dept., Armed Forces Information School, Fort Slocum, New York.

FROM EYE TO CAMERA. By Ray Bethers. Pitman Publishing Corp. 138 pages. $3.75.

This is a book about photography with no technical information—not a mention of lenses, cameras, developing or printing . The tools it deals with are those you use in the making of a creative photograph—subject matter, light, color, variety, pattern, space, pictorial arrangement and balance, as well as your own feeling, knowledge, and experience.

The book is designed to intensify your individual creative expression, to help you make complete and imaginative pictures. For imagination, says the author, "is not necessarily the creation of something entirely new, but only the seeing of ordinary things in new relationships. That is really what this book is about."

RADIO AND TELEVISION RECEIVER CIRCUITRY AND OPERATION. By Alfred A. Ghirardi and J. Richard Johnson. $6.

This practical treatment of modern television and radio systems and receivers includes in its coverage the latest developments in circuits, antennas, materials of construction, principles of operation and explanations of the AM, FM, and TV forms of transmission. Modern recorders, record changers, and pickup devices are also thoroughly discussed, with a wealth of information on new magnetic recording devices.

Throughout the book the treatment is nonmathematical and couched in terms familiar to all radiomen. All types of circuits now in use in home receiver installations are explained, up to and including the latest wrinkles. A generous glossary of terms at the end of the text provides the beginning radioman or student with immediate clarification of words or expressions.

Our Book Department can furnish any book currently in print. We will also help to secure older titles that you may need to complete your library. A 10% discount is allowed all Association members on orders of $10.00 or more. Please indicate author and publisher where known, and allow three weeks for procurement and delivery.

THE RADIO AMATEUR'S HANDBOOK (Twenty-eight edition, 1951). By the Headquarters Staff, American Radio Relay League. 768 pages. $2.50.

The standard manual of amateur radio communication, revised and restyled in the light of current needs as a radio construction manual, reference work, and training text for class or home study.

One of two completely new chapters deals with the design and construction of single-band suppressed carrier radiotelephone transmitters, the other with mobile techniques which are so important in communications preparedness for emergencies.

SIGNAL VENTURE. By Brigadier L. H. Harris, C.B.E., T.D., M.Sc., M.I.E.E.* Gale & Polden, Ltd. (England), 18 shillings ($2.52).

Signal Venture, which started out to tell the story of the planning and execution of the long-distance military communications for the invasion of northwest Europe in 1944, turned out to be a narrative of the personal experiences of the author as a linesman with the Royal Australian Corps of Signals during World War I, as a telecommunications engineer with the General Post Office of the United Kingdom during the period between wars, as a signal officer, Royal Corps of Signals, British Army, in the early days of World War II, through the retreat from Dunkirk, in the planning for the defense of the British Isles from the threat of German invasion, and for the Allied invasion of continental Europe, and finally as chief of the telecommunications section, Supreme Headquarters, Allied Expeditionary Forces, and a member of the great international staff at SHAEF.

*Commander British Empire; Territorial Decoration; Master of Science; Member, Institute of Electrical Engineering.

Brigadier Harris' book is thrilling, immensely interesting, and fascinating reading. It not only paints a picture which will inspire signalmen everywhere, but it is "required reading" for all who are interested in military signal communications from the battalion to theater headquarters and should be read by all who have a broad interest in telecommunications. Members of the Signal Corps, U.S.A., who participated in the planning for "operation Overlord" will appreciate Brigadier Harris' dry comment, "I do not think we ever considered Americans as foreigners in quite the ordinary sense . . ." Americans' on the other hand, may have some difficulty with Brigadier Harris' casual and typically British use of official initials, but many of these designations are old friends to those who served in Europe during World War II and bring to the reader the flavor and atmosphere of signal operations.

Brigadier L. H. Harris, C.B.E., T.D., M.Sc., M.I.E.E.

As one who worked with "Brig" Harris during the trying and difficult days from the liberation of Paris to V-E Day, I recommend *Signal Venture* to students of modern warfare, and to those who like to read a thrilling tale of high adventure and difficulties overcome.

Carroll O. Bickelhaupt
Brigadier General, AUS (ret.)

Westinghouse Electric Corp.

A new 10-page railroad radio booklet, "Analyze Your Adjacent Channel Problems," has been prepared by the Westinghouse Electric Corp. It presents a new, relatively simple graphical method of evaluating the adaptability of FM radio equipment for adjacent channel use.

For a copy of this booklet, SA-6736, write J. Schlig, Westinghouse Electric Corp., 2519 Wilkins Ave., Baltimore 3, Maryland, and refer to this offer in SIGNAL.

Insignia of the Association

AVAILABLE TO MEMBERS FROM THE SERVICE DEPARTMENT

The Association insignia in several beautiful designs and convenient styles authorized for wear by members is available at the prices quoted below. Order from AFCA Service Department, 1624 Eye St., N. W., Washington 6, D. C. The insignia is described as follows:

The central figure is an alert powerful American eagle with strong talons clutching lightning flashes—symbolic of a strong America and national defense—especially insofar as modern communications is concerned, our basic reason for existence. The border consists of leaves of the olive branch of peace, showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signalling in sea and land warfare by United State forces. Just above the eagle and between his outstretched wings is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, and in Naval and Marine aviation. Above that is a radar antenna array, and at the very top a radio rely antenna—for the latest major step in military communications. And none of these could exist without industry—the foundation of AFCA. In the color version there are the traditinal colors of the signal flags—dexter white with red center and sinister red with white center—with a gold border to the whole.

Members should take every opportunity to display AFCA insignia. Worn on the uniform or civilian dress, or displayed on home or office wall, it carries with it an identification of distinction, is decorative, and helps to widen the scope of our Association by bringing it to the attention of others. Emblem is available in a variety of attractive forms.

ASSOCIATION MEDAL

Wrought on the medal in sharp and bold relief is the AFCA insignia. 1⅜ inches in diameter (shown at the right, actual size), the medal is suspended from a ribbon of heavy grosgrain silk in orange and dark blue. The medal is authorized for wear on the uniform as provided in A.R. 600-40, paragraph 68g and 30c (2) (dated 31 March 1944). Prices: $3 in bronze, $4 in silver, $5 in gold. Medal is not available for sale to student members.

LAPEL BUTTON FOR CIVILIAN WEAR

Bronze	**$1.50 (including tax)**
Sterling	**2.50 (including tax)**
10-K Gold	**5.00 (including tax)**

Specify whether signal flags should be in red and white enamel or plain.

MEMBERSHIP CERTIFICATES

Printed on fine diploma paper with the Association emblem in full color and the member's name engrossed.
Price $1.50.

DECALCOMANIAS

Decalcomanias of the association insignia are now available from the service department. Three inches in diameter, in full color (eagle and wreath in bronze, red and white signal flags, against a silver-gray background) these decals can be transferred from either side to glass, or any other smooth solid surface, so that they will appear to be painted on that surface.

Price—4 for $1.

then change to 2,400 for working. If there is interference there, why we just throw in another couple of turns of the tuning coil and go up to 3,000, 3,400 or even 4,000 meters. It's a grand set.

* * * *

"Had a visit from Bill Kirchhoff the other day. He stopped in the office and we had lunch together. He's on a freighter running from New York to Germany. He was there last month when Hindenburg died and saw some of the funeral procession. He said it was quite impressive. Things have certainly changed aboard ship since I swallowed the anchor. Bill says that they're using vacuum tube transmitters almost exclusively. I never would have believed it. They use 'em on 600 meters* and again somewhere near 30 meters too. He seems to like them but then Bill always was a sort of radical. He told me there was hardly a spark set left on the ocean and not many arcs. And, get this, the big liners now have wireless telephone for the use of passengers. They place a call just like making a long distance call here at home. I'm glad I got out of the game when I did. Can you imagine it, the operator these days is just a sea-going "hello girl" with pants?

* * * *

"How much of this the censor will pass, I don't know but here goes. We're sitting in a replacement depot somewhere in North Africa. Our trip over was fairly quiet because we were in convoy with plenty of Navy for protection. I was on a transport which was a former liner and got acquainted with one of the operators. He was an old friend of Karl Baarslag's so we hit it off in good shape. He took me up to the radio room one day and showed me his gear. You'd never have recognized it. It certainly didn't look like the sets I used to work. This new stuff is mighty complicated and I'll bet it doesn't have the reliability ours had. Nothing but vacuum tubes—for everything. I understand that now they're going to use radio teletype from ship to shore. Well, that's the final blow. An operator won't have to know a thing any more. I suppose you won't even need a license in another few years—only a diploma from some business college to prove you know how to peck a typewriter. I'm sure glad I got out of that business when I did."

* * * *

"As you probably know, I've been stationed at Fort Monmouth for the last few months and have had an opportunity to see quite a bit of the new Signal Corps radio equipment. The SCEL engineers are proud of their AN/GRC-3-through-8 series. I suppose you know about it. They are ballyhooing the 'building block' aspects of its use and on paper it is most remarkable. Some of the individual 'blocks' are about the same size and proportions as the good old SCR-194. There was a honey of a set for you! Remember how we used them on the Plattsburg maneuvers in '39?

I can't help wondering if we aren't hasty in discarding our equipment. There is much to be said in favor of the older designs. Of course there's all this emphasis on research and development, advancement and progress. Well, I've seen forty years of it and where has it led?

In 1910 we had galena with one cat-whisker. Then came the transitor with two. And now, happy day, the Priests of Progress have done it again!

We greet 1951 with a third cat-whisker!

*Ibid.

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Write our Special Electronics Department for further details.

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Walter E. Dittmar

President, The Gray Manufacturing Company
Hartford, Connecticut